

QST

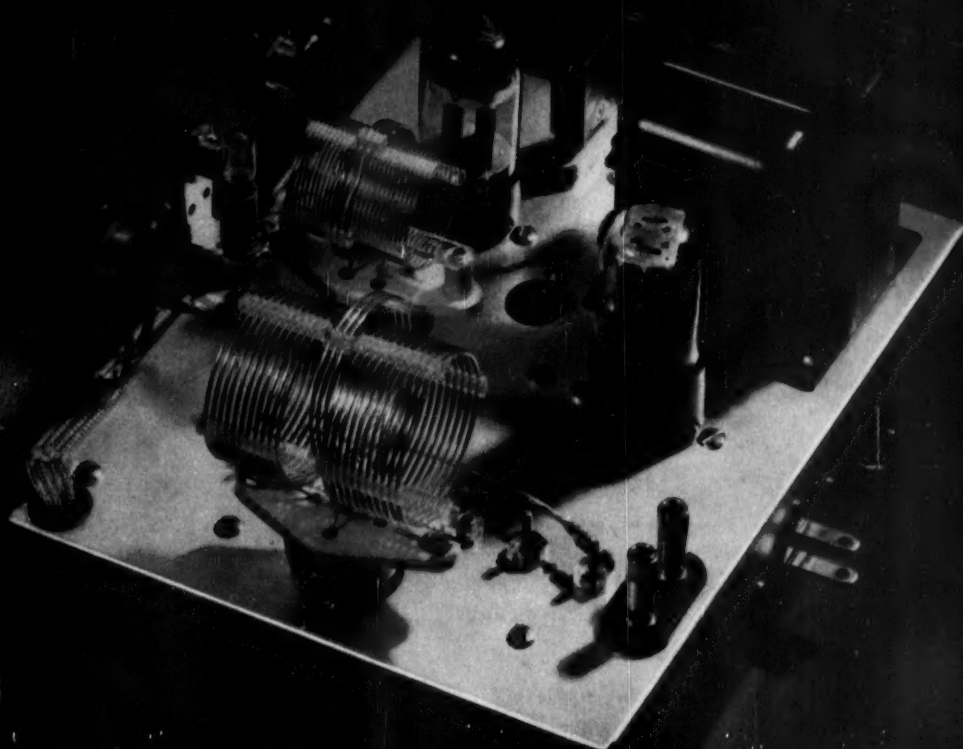
April 1953

40 Cents

45c in Canada

devoted entirely to

# amateur radio



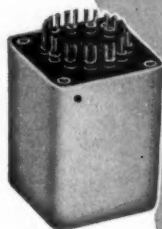
# ULTRA COMPACT UNITS...OUNCER UNITS

## HIGH FIDELITY . . . . SMALL SIZE . . . . FROM STOCK

UTC Ultra compact audio units are small and light in weight, ideally suited to remote amplifier and similar compact equipment. High fidelity is obtainable in all individual units, the frequency response being  $\pm 2$  DB from 30 to 20,000 cycles.

True hum balancing coil structure combined with a high conductivity die cast outer case, effects good inductive shielding.

Type No.	Application	Primary Impedance	Secondary Impedance	List Price
A-10	Low impedance mike, pickup, 50, 125/150, 200/250, 50 ohms or multiple line to grid	333, 500/600 ohms	50,000 ohms	\$16.00
A-11	Low impedance mike, pickup, 50, 200, 500 or line to 1 or 2 grids (multiple alloy shields for low hum pickup)	333, 500/600 ohms	50,000 ohms overall, in two sections	16.00
A-12	Low impedance mike, pickup, 50, 125/150, 200/250, or multiple line to grids	333, 500/600 ohms	50,000 ohms overall, in two sections	16.00
A-14	Dynamic microphone to one 30 ohms or two grids	50,000 ohms overall, in two sections	50,000 ohms overall, in two sections	17.00
A-20	Mixing, mike, pickup, or mul- 50, 125/150, 200/250, 333, 500/600 ohms	50, 125/150, 200/250, 333, 500/600 ohms	50, 125/150, 200/250, 333, 500/600 ohms	16.00
A-21	Mixing, low impedance mike, 50, 200/250, 500/600 pickup, or line to line (multiple alloy shields for low hum pickup)	50, 200/250, 500/600 ohms	50, 200/250, 500/600 ohms	18.00
A-16	Single plate to single grid 15,000 ohms	15,000 ohms	60,000 ohms, 2:1 ratio	15.00
A-17	Single plate to single grid 8 MA unbalanced D.C.	As above	As above	17.00
A-18	Single plate to two grids. Split primary	15,000 ohms	80,000 ohms overall, 2:3:1 turn ratio	16.00
A-19	Single plate to two grids 8 MA unbalanced D.C.	15,000 ohms	80,000 ohms overall, 2:3:1 turn ratio	16.00
A-24	Single plate to multiple line 15,000 ohms	15,000 ohms	50, 125/150, 200/250, 333, 500/600 ohms	16.00
A-25	Single plate to multiple line 15,000 ohms 8 MA unbalanced D.C.	15,000 ohms	50, 125/150, 200/250, 333, 500/600 ohms	17.00
A-26	Push pull low level plates to 30,000 ohms plate to plate	30,000 ohms	50, 125/150, 200/250, 333, 500/600 ohms	16.00
A-27	Crystal microphone to mul- 100,000 ohms	100,000 ohms	50, 125/150, 200/250, 333, 500/600 ohms	16.00
A-30	Audio choke, 250 henrys @ 5 MA 6000 ohms D.C. 65 henrys @ 10 MA 1500 ohms D.C.	250 henrys @ 5 MA 6000 ohms D.C.	65 henrys @ 10 MA 1500 ohms D.C.	12.00
A-32	Filter choke 60 henrys @ 15 MA 2000 ohms D.C. 15 henrys @ 30 MA 500 ohms D.C.	60 henrys @ 15 MA 2000 ohms D.C.	15 henrys @ 30 MA 500 ohms D.C.	10.00



TYPE A CASE  
1 1/2" x 1 1/2" x 2" high

UTC OUNCER components represent the acme in compact quality transformers. These units, which weigh one ounce, are fully impregnated and sealed in a drawn aluminum housing 3/8" diameter...mounting opposite terminal board. High fidelity characteristics are provided, uniform from 40 to 15,000 cycles, except for 0-14, 0-15, and units carrying DC which are intended for voice frequencies from 150 to 4,000 cycles. Maximum level 0 DB.



OUNCER CASE  
3/8" Dia. x 1 1/4" High

Type No.	Application	Pri. Imp.	Sec. Imp.	List Price
0-1	Mike, pickup or line to 1 grid	50, 200/250 500/600	50,000	\$14.00
0-2	Mike, pickup or line to 2 grids	50, 200/250 500/600	50,000	14.00
0-3	Dynamic mike to 1 grid	7.5/30	50,000	13.00
0-4	Single plate to 1 grid	15,000	60,000	11.00
0-5	Plate to grid, D.C. in Pri.	15,000	60,000	11.00
0-6	Single plate to 2 grids	15,000	95,000	13.00
0-7	Plate to 2 grids, D.C. in Pri.	15,000	95,000	13.00
0-8	Single plate to line	15,000	50, 200/250, 500/600	14.00
0-9	Plate to line, D.C. in Pri.	15,000	50, 200/250, 500/600	14.00
0-10	Push pull plates to line	30,000 ohms plate to plate	50, 200/250, 500/600	14.00
0-11	Crystal mike to line	50,000	50, 200/250, 500/600	14.00
0-12	Mixing and matching	50, 200/250	50, 200/250, 500/600	13.00
0-13	Reactor, 300 Hys.—no D.C.; 50 Hys.—3 MA. D.C.	6000 ohms	6000 ohms	10.00
0-14	50:1 mike or line to grid	250	1/2 megohm	14.00
0-15	10:1 single plate to grid	15,000	1 megohm	14.00

# Use

## G-E GERMANIUM DIODES

- Save space ...
- Increase rectifier life ...
- Get top dollar value!

**THINK OF THE SPACE SAVED** when you use diode rectifiers approximately  $\frac{1}{8}$ " long,  $\frac{1}{16}$ " diameter! Think of that worry-free feeling that comes from knowing these tiny marvels can give you 10,000 hours and more of reliable service!

**DIODES ARE SELF-HEALING** when temporary over-voltage occurs. They stand up under shock and vibration. They have no filaments to heat, so power drain is less. You get no filament hum!

**YOUR G-E TUBE DISTRIBUTOR** is your best source for germanium diodes, for General Electric makes and markets more diodes than any other manufacturer. Huge G-E production by the most modern methods assures dependable performance—packs extra value into thrifty G-E prices.

**CHECK THE LIST BELOW** for popular G-E types. There are many more available. Then see your distributor for further information, including descriptive diode Bulletin ECG-3B. Or write Tube Department, General Electric Company, Schenectady 5, New York.



TYPE		USE	INVERSE VOLTAGE		RECTIFIED CURRENT (IN MA)			
RTMA	G-E		PEAK	CONTINUOUS OPERATION	OPERATING	PEAK	SURGE, 1 SEC.	MAX INV. AT -50 V
1N48	G5	General	85	70	50	150	400	.833
1N52	G5D	General	85	70	50	150	400	.15
1N63	G5E	General	125	100	50	150	400	.05
1N64	G5F	*Video Det.	20	—	—	—	—	.25 at -1.3 v
1N65	G5G	General	85	70	50	150	400	.20
1N69	G5K	General	75	60	40	125	400	.85
1N70	G5L	General	125	100	30	90	350	.30
1N72	G7	**U-h-f	2	—	25	75	—	—
1N81	G5P	General	50	40	30	90	350	.01 at -10 v

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another G-E "first"—Diffused-junction Germanium Rectifiers! Hermetically sealed against humidity and dust ... extremely small and compact ... with high output ratings, low leakage loss. Your G-E tube distributor has them!

1N91	4JA1A1	General	100	30	150	470	25 amp	—
1N92	4JA1A2	General	200	65	100	310	25 amp	—
1N93	4JA1A3	General	300	100	75	230	25 amp	—
1N94	4JA2A4	Line volt. rect'r	400	185	500	1570	25 amp	—

\*Tested at 44 mc for rectifying efficiency.

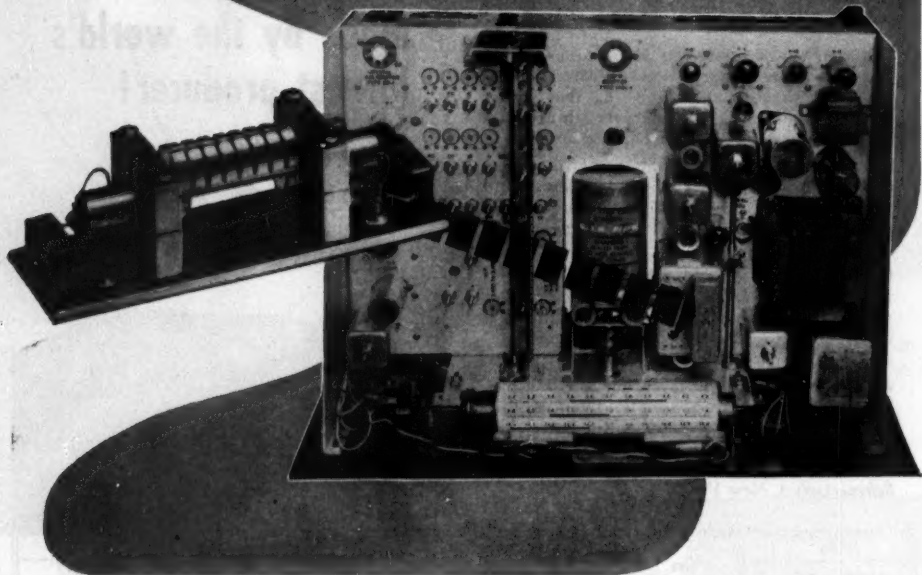
\*\*Tested at 500 mc as a low-noise mixer.

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155\*184

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years old, it can share honors with the 75A-3 as the world's most advanced ham receiver.

Conversion kit, complete with a 3 kc plug-in mechanical filter and instructions  
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# QST

APRIL 1953

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# Q R K ? \*

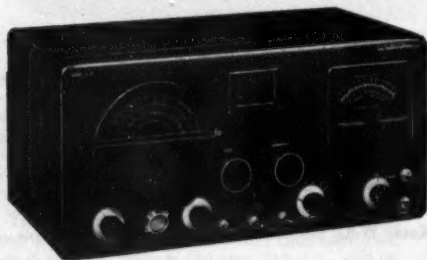
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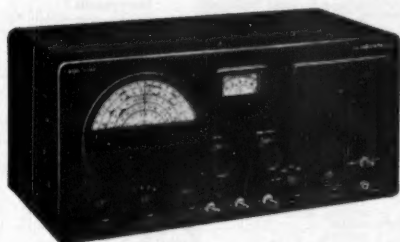
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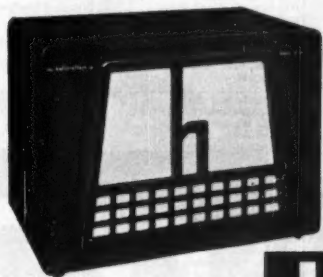


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**Reports Invited.** All amateurs, especially League members, are invited to report station activities on the first of each month (or preceding month) direct to the SCM, the administrative ARRL official elected by members in each Section. Radio Club reports are also desired by SCMs for inclusion in QST. **All ARRL Field Organization appointments** are now available to League members. These include ORS, OES, OPS, OO and OBS. Also, where vacancies exist SCMs desire applications for SEC, EC, RM, and PAM. In addition to station and leadership appointments for Members, *all amateurs* in the United States and Canada are invited to join the Amateur Radio Emergency Corps (ask for Form 7).

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It is an incorporated association without capital stock, chartered under the laws of Connecticut. Its affairs are governed by a Board of Directors, elected every two years by the general membership. The officers are elected or appointed by the Directors. The League is noncommercial and no one commercially engaged in the manufacture, sale or rental of radio apparatus is eligible to membership on its board.

"Of, by and for the amateur," it numbers within its ranks practically every worth-while amateur in the nation and has a history of glorious achievement as the standard-bearer in amateur affairs.

Inquiries regarding membership are solicited. A bona fide interest in amateur radio is the only essential qualification; ownership of a transmitting station and knowledge of the code are not prerequisite, although full voting membership is granted only to licensed amateurs.

All general correspondence should be addressed to the administrative headquarters at West Hartford, Connecticut.



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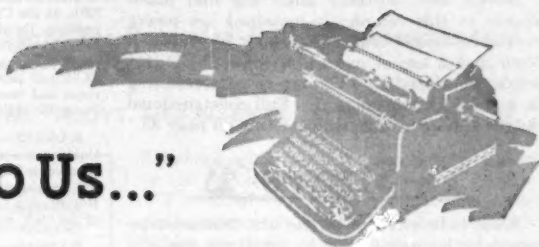
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## "It Seems to Us..."



### CONELRAD FOR AMATEURS

One of the problems of a nation tightening its defenses is radio security, which among other things includes insurance against the use of domestic radio stations as "homing" objectives to aid the navigation of enemy aircraft. Such stations are beacon lights pointing the way to the hearts of our industrial cities. A way must be found to extinguish these "lights," or otherwise render them useless, in time of emergency.

The Communications Act of 1934, as amended, provides the President (in time of declared national emergency, as now) with broad authority to control or even close radio stations. By an Executive Order in December, 1951, the President delegated much of this power to the Federal Communications Commission, along with instructions to set up a security system for all civilian radio services. The term "Conelrad" was derived from the phrase, "control of electromagnetic radiations." Broadcast stations were the first on the list, and it has taken these many months to set up the measures now being put into effect. Briefly, in the event of an aircraft warning, all f.m. and TV stations would go off the air, and all a.m. stations would either do likewise or shift to one of two spot frequencies, 640 or 1240 kc., and operate in what is known as cluster patterns with precautions designed to thoroughly confuse any direction-finding equipment.

In their own way, amateur stations might be beacons, too. For that reason some reasonable procedure is needed to provide suitable warning for amateurs so that they may leave the air in the event of impending enemy attack. So, early in February another step in the implementation plan was taken with the holding, by FCC, of an informal engineering conference in Washington to discuss a Conelrad system for the amateur service. The discussion on this and related subjects occupied a full day, at the end of which it appeared a common viewpoint that such a warning procedure could best make use of the established system for broadcasters. One form it might take would be that before an amateur went on the air, he would check the local b.c. band. If stations were

operating normally, he would be free to proceed. But if the usual local stations were off the air, or were observed to go off the air while ham operating was in progress, and all local b.c. carriers on 640 or 1240 kc., he would be alerted to stay off, or go off the air at the time the general Conelrad condition went in effect. A continuous check would be the obvious aim. Monitoring the broadcast band aurally is the simplest system, but there are more practical ones and several technical approaches suggest themselves. For example, an amateur might build himself an automatic device by tying a relay-operated indicator into the a.v.c. line of an a.c.-d.c. set, to show whether a local b.c. station were on the air. Gadgets of this nature have appeared in radio magazines off and on for a number of months now, and QST will undoubtedly carry similar data tailored to ham needs when the rules are made final and the actual requirements known.

It is expected that the Commission will now move toward issuing proposed rule-making for amendment of our regulations to require observance, and therefore we shall then have the opportunity to file comment if desirable. It is, at present at least, contemplated that FCC rules would not require any specific equipment or systems, but simply obligate the amateur to have some means of knowing of attack warnings or alerts when issued.

We should here underscore that what we have been talking about is a procedure strictly for the amateur service in the present condition of national emergency. Participants operating in the Radio Amateur Civil Emergency Service are subject to control by their radio officers, who separately will establish such silencing procedures as are found necessary for security.

No one, FCC included, looks forward with any eagerness to the obligation which will be imposed on amateurs' operations. It is simply a necessary evil required for our common interest by the complexities of the world situation. We know that amateurs will tackle this new job with full understanding that it is in the public interest and that, as always, the thoroughness with which we do the job will further reflect credit upon the amateur service.

## OUR COVER

Novice and old-timer alike will find much appeal in this completely-contained low-power crystal-controlled transmitter built by W1JEQ. Vern makes use of one of the new 6BL7 dual triodes developed for TV sweep circuits, resulting in a compact two-stage rig. Full constructional details appear in this issue starting on page 35.

## Strays

What is believed to be the first transistor-to-transistor communication by amateurs was held on February 13, 1953. The contact was between W2JEP and W2YTH at a distance of half a mile.

Two single-stage transistor transmitters were operated c.w. on 40 meters with a power input of 60 milliwatts. The signal reports were R5 and S8/9 and would probably have been readable much farther. The oscillator at W2YTH was crystal-stabilized and showed better frequency stability than the one used by W2JEP which had no crystal.

We believe that this contact is a "first" in amateur communications on any band and if this is disproved we limit the claim to the 40-meter band. Are there any challengers?

— W2JEP and W2YTH

W1FWH was disturbed by an implication contained in the description of W6WZD's "Tree-Top Beam" on page 46 of February QST. Walt assures us that anyone the least bit familiar with tree-ology knows that the array can't possibly "grow higher day by day." The tree will merely grow up around it!

Roy D. Jordan, W2KUD, and Neal F. Harmon were recently honored by the presentation of the Charles A. Coffin Award, highest honor given by the General Electric Company to its employees. Mr. Jordan, advertising and sales promotion manager for the GE Commercial and Government Equipment Department at Syracuse, has had 25 years of continuous service with the company.

W2KUD is active in civil defense and emergency work, has held OPS, OBS, ORS and EC appointments, is a member of the Old Timers Club and was first licensed in 1923.

## Quiz

During a discussion of antennas, A makes the statement that "Any Twin-Lead feed line will radiate unless the standing-wave ratio is brought down to a very low value — something below 1.2 or so." B takes exception to this remark, claiming that the s.w.r. has very little to do with the radiation from a line of this type. Who is right?

(Please turn to page 140 for the answer)

## HAMFEST CALENDAR

**ARKANSAS** — Saturday and Sunday, April 11th and 12th, at the Crescent Hotel, Eureka Springs — a non-profit hamfest. On the agenda for Saturday are a buffet supper, hayride, square and round dancing, and a midnight wiener roast. A banquet will be held at noon on Sunday. The fee of \$3.75 per person covers the above-listed activities, plus room and board with the exception of Sunday breakfast. Write W5MED for further information.

**KANSAS** — Sunday, April 12th, at the City Building, Coldwater — the Coldwater Amateur Radio Club will sponsor its hamfest. Those who attended last year's hamfest will be pleased to know that another auction will be held. Registration to be handled at the door. W0DOZ, president of the club, will answer inquiries.

**KANSAS** — Sunday, May 3rd, at the American Legion Hall, Batanta — the Fourth Annual Hamfest of the Hi Plains Amateur Radio Club will be held. This will be an all-day meeting with entertainment for all, including the XYLs and children. Everyone is requested to bring a covered dish contribution for the luncheon at noon. For further information, write to W8GID.

**NEW JERSEY** — Saturday, April 25th, in the Grand Ball Room of the Hotel Stacy-Trent, Trenton — the Ninth Annual Old Timers' Nite Round-up and Banquet will be held, sponsored by the Delaware Valley Radio Association, to honor the early living pioneers of wireless and to reminisce on their experiences of yesteryear. Turkey dinner will be served promptly at 6:30, after which the program will include personalities prominent in early wireless history. Bring along your oldest amateur and commercial tickets, as awards will be made to those holding the earliest dated licenses. A special award will go to the "Grand OM" whose radio operating experiences can be traced back to the earliest days of wireless. W2ZI's famous collection of old-time gear will be on display. Tickets are by reservation only, and may be obtained prior to April 21st from General Chairman Ed Raser, W2ZI, 315 Beechwood Ave., Trenton 8, at \$5.00 per person. Late comers without tickets will pay \$6.00 at the door. Guests are welcome, regardless of age or amateur experience. As in the past, the party will be stag.

**NEW YORK** — Saturday, April 25th, at the Elks Club, Rochester — the Rochester Amateur Radio Association will hold a Western New York Hamfest. The afternoon program will consist of a number of technical and group sessions, with exhibits and amusements of various types. Following the dinner at 6:30 p.m. the evening program will feature speakers. Special plans have been made for the XYLs, with several sessions of particular interest to them. Registration begins at 2:00 p.m., with tickets selling for \$3.75.

**PENNSYLVANIA** — Saturday, April 18th, at the Stock Yards Inn, Lancaster — the Annual Banquet of the Lancaster Radio Transmitting Society. Festivities will begin at 6:30 p.m., and entertainment has been planned for OMs, YLs and XYLs. Registrations are in advance, \$2.50 per person, and may be obtained through A. C. Jacoby, W3OY, 589 N. Plum St., Lancaster.

**WISCONSIN** — Saturday, April 18th, at the Youth Building, Wausau — Annual Hamfest and Banquet of the Wisconsin Valley Radio Association. Scheduled for the afternoon is a meeting of the Wisconsin Council of Radio Clubs delegates at 1 p.m., followed by a Section meeting of appointees and net members at 3 p.m. Beginning at 6 p.m. a well-rounded program has been arranged featuring an excellent banquet, entertainment and hamfesting galore. Transmitters on 3950 and 29,620 kc. will be on the lookout for incoming mobiles. Please make reservations in advance to assist with meal plans. Tickets available for \$3.00 from Lawrence Lapinske, W9EWM, P. O. Box 179, Wausau.

### COMING A.R.R.L. CONVENTIONS

June 20th-21st — Rocky Mountain Division, Estes Park, Colo.

July 10th-12th — National Convention, Houston, Texas

# Meteor Scatter

## A Newly-Discovered Means for Extended-Range Communication in the 15- and 20-Meter Bands

BY OSWALD G. VILLARD, JR.,\* W6QYT, AND ALLEN M. PETERSON,\*\* W6POH

\* Although you might not suspect it, in view of this past winter's experience, the 14-Mc. band is never completely "dead." This article describes a newly-discovered type of propagation that is always present, for which the optimum communication distance is of the order of 800 miles. It has gone undetected for many years because it is usually masked by other forms of propagation and requires first-rate equipment for its exploitation — equipment which, however, is not at all unusual.

**W**ANT to keep a schedule with someone seven or eight hundred miles away after the 20-meter band has "gone dead" at night? Thanks to a recent discovery in which amateurs have played a part, it is now possible to do this without shifting down to a lower frequency and battling the usual QRM. By taking advantage of a new type of radio propagation known as "meteor scatter," two stations can communicate far beyond ground-wave range all night long and have the band essentially to themselves.

Furthermore, QSOs can be carried on by this means all day long too, even though the station at the other end is well inside the skip zone at all times. And best of all, here is one type of reasonably long-distance radio transmission which promises not to be subject to fadeouts, ionospheric storms, and all the other uncertainties which plague the regular ionospheric layers.

\* Trustee, W6YX; Dept. of Electrical Engineering, Stanford University, Stanford, Calif.

\*\* Radio Propagation Laboratory, Stanford University, Stanford, Calif.

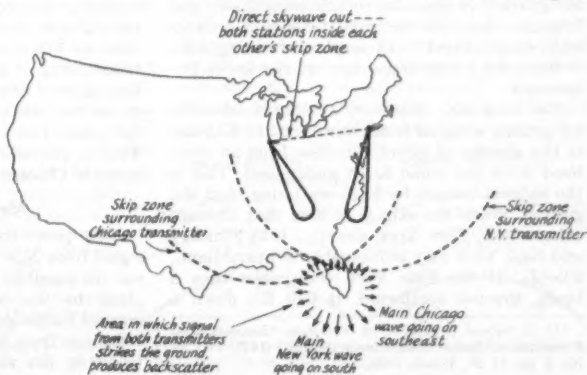
Schedules using this type of propagation should be 100 per cent successful.

The catch? Yes, there is one, for new types of propagation such as this don't keep themselves hidden all these years without good reason. The disadvantage is that at amateur power levels, it is necessary to be content with a fairly weak signal, and one which fades fairly rapidly between very wide limits. The signal is on the average too weak for satisfactory telephony, but is adequate for c.w. It makes occasional brief dips into the noise, but promptly comes back again. It will often rise twenty or thirty decibels above the noise, for as much as five or ten seconds at a time. The astonishing part of the matter is that the signal — at least *some* signal — is there substantially all of the time, even when the band, by every normal criterion, should be completely dead!

What does one need to take advantage of this form of transmission? Nothing more than an efficient station, and some knowledge of what to expect. Briefly, the explanation of the signal — at least in the vicinity of 20 meters — is forward scattering from ionization trails left behind by the myriads of tiny meteors which pepper the *E* region of the ionosphere at all times. Hence the maximum range for this form of transmission is essentially that for normal one-hop *E*-layer transmission, or 1500 miles. For reasons which will be brought out later, a good transmission distance in practice is about half this value, or around 800 miles.

In view of the low height of the *E* region — roughly 70 miles — the vertical angle of take-off even for the shorter distance is quite low — of the order of 5 or 6 degrees. Thus a good site is a requirement: one which does not have nearby mountains or apartment houses screening off

Fig. 1 — Point-to-point communication by ground scattering after layer reflection over the great circle path has failed.



Visible meteors during a shower: a two-second exposure during the great Draconid display of October, 1946. Lines drawn through individual meteor trails (inside circles) intersect at a common point known as the shower radiant. Thousands of meteors too small to be seen — but producing radio reflections — strike the E region of the ionosphere at all times.

low-angle radiation in the desired direction of communication. An antenna well up in the air, a sensitive receiver, and a location reasonably free of man-made QRN are also important. If this sounds formidable, remember that these are no more than the requirements for reasonably good DX results. A "full gallon" is not essential — two or three hundred watts will do, although the more the merrier. It follows that many thousands of operators throughout the country should be able to take advantage of this new type of extended-range transmission.

#### Ground-Scatter Transmission

How does this type differ from those to which we are already accustomed? The story, briefly, is as follows. Consider two cities, say New York and Chicago, spaced roughly 800 miles apart. (Any other two cities, spaced the same distance, would do equally well.) Until fairly recently, it was thought that communication between these two communities at frequencies below 30 megacycles could *only* be conducted when the "regular" layers — F, E and sporadic-E — were sufficiently ionized to reflect a signal from one city to another. The distance involved is much too great for ground- or space-wave communication, and it is also too great for the extension of ground-wave range caused by tropospheric bending, even if that effect were important at the lower frequencies.

Not long ago, however, another mechanism for getting a signal from New York to Chicago in the absence of direct reflection from an overhead layer has come to be understood. This is the indirect bounce by back-scattering from the ground. When the skip is so long that Chicago cannot hear New York directly, both Chicago and New York may still be able to hear Miami, Florida. If the New York transmitter uses a beam directed southward, it will lay down a

strong signal all over the state of Florida and the Atlantic Ocean on one side, and the Gulf of Mexico on the other. A small but detectable part of this signal will be scattered in all directions by water waves in the Gulf and the Atlantic, by houses and trees on the land, and so forth. If the Chicago station also uses a beam directed at Florida, it will be able to pick up scattered components of the signal originating in New York, and the two stations will be able to communicate via Florida, as in Fig. 1. The indirect signal will be much weaker than a direct bounce over the great circle path, and will have a hollow, fluttery sound not unlike that of a DX station, but it will be well above the noise level and perfectly readable for both voice and code. (See description on page 74 of the 1953 *ARRL Handbook*.)

This type of scattering has been observed quite regularly by amateurs interested in 50-megacycle DX, and has been given a variety of names including "rebound scattering" and "reflected skip." The authors, who prefer to call it "ground scattering" since this seems to be the more descriptive term, have shown some photographs illustrating it in their article on scatter-sounding in the March, 1952, *QST*.<sup>1</sup> Those photographs show scatter echoes received at the same spot from which the initial signal had been transmitted; it should be understood, of course, that ground scatter echoes from a given transmitter can also be heard at other locations inside the skip zone surrounding that transmitter. Thus a scatter-sounder in New York would be heard in Chicago under conditions of Fig. 1.

#### Meteor Reflections

Now about the only remaining way to get a signal from New York to Chicago — if we leave out the possibility of bouncing a signal from one place to the other via exceptionally strong auroral ionization to the north — is by means of reflection from a meteor column formed somewhere in the vicinity of the great-circle path.

<sup>1</sup> O. G. Villard, Jr., and A. M. Peterson, "Instantaneous Prediction of Radio Transmission Paths," *QST*, Vol. 36, No. 3, pp. 11-20, March, 1952.

It has been thought until recently that these meteor reflections were always of short duration, and of no practical value for communication except perhaps during an exceptionally strong meteor shower such as the great one of October, 1946. This impression has stemmed from the fact that most observations of meteors have been conducted with transmitter and receiver at one location, which is clearly the most convenient experimental arrangement. Under these conditions relatively isolated reflections, or signal bursts, are obtained.

Recent advances in understanding the nature of these reflections, however, have led to some interesting conclusions.<sup>2</sup> It is now known that there are in general two types of meteor echoes. About 10 per cent of the total detected under ordinary conditions have very long durations (ten seconds to ten minutes), strong fading fluctuations, and an irregular and unpredictable "life history." Their behavior is not yet well understood. The other 90 per cent of the echoes

at 14 megacycles, the same echo would last only one-fourth of a second at 28 megacycles.

Lastly—and here is the payoff—it has been discovered that the duration of a meteor echo at any given frequency, increases very rapidly when transmitter and receiver are separated by several hundred miles. This increase factor is proportional to the square of the secant of the forward-scattering angle  $2\phi$  in Fig. 3. It works out that for a transmitter-to-receiver distance of 800 miles, the remote reflection produced by a meteor column formed over the midpoint of the path will have a duration more than twenty times that which it would have if the receiver were adjacent to the transmitter.

Thus, by going to a relatively low frequency, such as 14 megacycles, we get stronger echoes, and ones which have longer duration. Then, by changing from a backward to a forward path, we get another increase in echo duration—and quite a large one at that.

For some years, back-reflection experiments have shown that a truly astonishing number of meteor echoes can be received even with relatively low-power equipment. Measurements at Stanford University<sup>3</sup> using equipment and power levels substantially equivalent to that employed in a 1947 amateur experiment<sup>4</sup> have shown that at a frequency of 23.1 megacycles, during the early morning hours, several thousand meteor reflections per hour can be detected. This is at a rate of nearly one per second. The average duration of each echo at this frequency may be taken (conservatively) to be one-quarter of a second. This implies that on the average, meteor echoes are present for nearly one-quarter of the total time.

If now the frequency is lowered to 14 megacycles, and an 800-mile forward bounce is considered, the average duration of the meteor reflections is multiplied by a factor of roughly 50 times! Thus, if one echo occurs each second, and each echo lasts on the average twelve seconds, there will clearly be more than enough meteors present to guarantee a continuous signal by meteor reflections alone.

This picture is, of course, greatly oversimplified, although it does represent a fair approximation. For example, the area of the sky from which meteor echoes are obtained for overhead reflection is not the same as it is for distant reflection. However, when all the details are worked out, to the best of present knowledge, there

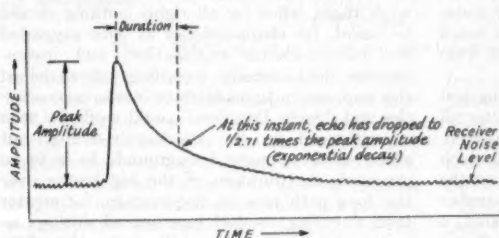


Fig. 2—"Life history" of the most commonly-encountered type of radio echo from a meteor trail. Shape is the same for either backward or forward reflection (see Fig. 3).

have a surprisingly regular behavior, being characterized by a rapid rise to peak amplitude, followed by a decay of exponential form as shown in Fig. 2. Since the decay is exponential, it is convenient to define duration as the time interval between the peak and the time at which the echo strength has dropped to roughly one-third the peak strength. Thus this "duration" is analogous to the time constant of a condenser discharging through a resistor.

Now it turns out that the height of the peak can be predicted quite accurately for this type of echo, and varies inversely as the three-halves power of frequency, assuming all other factors to be held constant. Thus, an echo having a peak of unit strength at 14 megacycles will be less than one-third as strong at 28 megacycles. Furthermore, the duration of this type of echo has been found to vary inversely as the frequency squared. Thus if an echo lasts for one second

<sup>2</sup> Von R. Eshleman, "The Mechanism of Radio Reflections from Meteoric Ionization," Technical Report No. 49, Electronics Research Laboratory, Stanford University, Stanford, Calif., July 15, 1952.

<sup>3</sup> L. A. Manning, O. G. Villard, jr., and A. M. Peterson, "Radio Doppler Investigation of Meteoric Heights and Velocities," *Journal of Applied Physics*, Vol. 20, No. 5, pp. 475-479, May, 1949.

<sup>4</sup> O. G. Villard, jr., "Meteor Detection by Amateur Radio," *QST*, Vol. 31, No. 7, pp. 13-18, July, 1947.

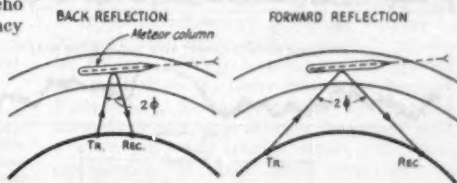


Fig. 3—Illustrating backward and forward reflection (or "scattering") from a meteor trail.

will be at 14 megacycles enough meteor reflections on the average at all times of the day and year to guarantee a continuous signal between two amateur stations separated by 800 miles and having moderate transmitter powers, good locations, and simple beam antennas.

### Accidental Discovery

This effect was turned up accidentally by the authors during the course of the W6YX scatter-sounding experiment,<sup>1</sup> which consisted of a demonstration that when echoes from a particular area appear on the scatter-sounder, strong signals can actually be heard from amateur stations located in that area. The converse, of course, was also investigated at the same time. In other words, the authors were just as eager to be able to show that when no echoes appeared from a given area, amateur signals could not be received from that area, either. This proved to be a tricky proposition, as was pointed out, because as long as any echoes appear anywhere on the indicator, it is always possible for a station in a supposedly "dead" region to be heard weakly by ground scattering via the area from which the echoes are coming.

It was decided that the most convincing test would be to wait until late on a night after all *F*, *E*, and sporadic-*E* activity had disappeared, and the indicator showed no echoes at all. Such nights are actually few and far between on the West Coast during the months of November and December. When one was at last found, a 'phone call was put through to Rod Beaudette, W7FXI, at Spokane, Washington, about 750 miles airline from Palo Alto. Rod, a Stanford graduate who had participated in the early meteor experiments at W6YX, has 500 watts on the air feeding a 3-element beam perched 30 feet above the roof of his house in suburban Spokane. At his location the ground slopes off toward the south (the direction to Palo Alto), and there are no intervening mountains to block off the horizon. Aside from this, Rod's location might be termed average, having the usual number of impedimenta in the form of light lines, neighboring houses, etc. W6YX's location (at least for the north and south directions) is better than average; the station is located atop a small hill one or two hundred feet above the

floor of the valley containing San Francisco Bay.

While Rod, awakened out of a sound sleep, good-naturedly went down into his basement to turn on the rig, we at Palo Alto thoroughly crossed our fingers and patrolled back and forth across an absolutely dead band. Suddenly, a signal! Could that drowsy-sounding voice be Rod's? In our excitement, we placed another 'phone call to verify it. There could be no doubt. Again we checked the amateur scatter-sounder. No sign of any echoes. No sporadic-*E* at all, and *F*-reflections had died out hours earlier. Yet there was W7FXI: at times unreadable on voice—at others, easily readable and well above the noise. During the dips, his carrier could always be copied by switching on the b.f.o. C.w. reception was quite satisfactory without the crystal filter, and much improved, of course, with it.

These tests were repeated as often as suitable conditions could be found, with similar results on each occasion. The signal was definitely always there, when by all rights nothing should be heard. Its characteristics at once suggested the meteor-scatter explanation, and instantaneous field-intensity recordings strengthened this impression. In addition to bursts, nose whistles and "body Dopplers" could easily be seen superimposed on the continually-fading, but almost-always-present background. As is to be expected, the duration of the big bursts over this long path was, on the average, far greater than anything we had experienced during the course of local tests. Fig. 4 illustrates this effect by showing the comparison between a recording of backward-reflected meteor echoes obtained locally, and a similar recording of forward-reflected meteor echoes over a 750-mile path. Echo overlapping in the latter case prevents accurate determination of individual echo durations but the increased average duration is clear.

### Other Paths

In the thought that there might be something magic about the path to Spokane, similar tests were carried out with W7PZ in Tucson, Arizona—about 750 miles away in a southeasterly direction. Ben has a three-element beam, about 300 watts, and a location outside Tucson on flat land not far from the airport. His signals were heard just as consistently as W7FXI's in Palo Alto.

In addition, W6HJT in San Marino—only 300 miles away and nearly south from Palo Alto—also put in a very strong signal with a steady background underlying the meteor bursts.

Attempts to increase the frequency or the distance met with less success, however. Transmissions to and from Tucson on 10 meters resulted in a signal audible only during well separated bursts, with no sign of a background between.

On one occasion, W0PRZ in Aberdeen, South Dakota, was asked to listen for the 20-meter W6YX signal. His dis-

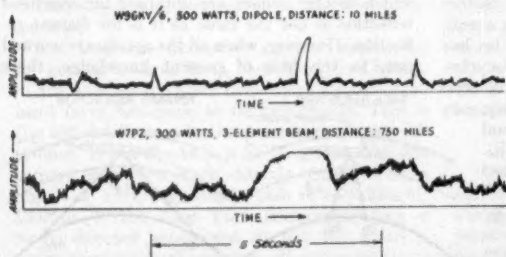


Fig. 4.—Forward and back-reflected meteor echoes at 14 megacycles. When these records were made (late at night), no layer propagation of any kind could be shown to be present.

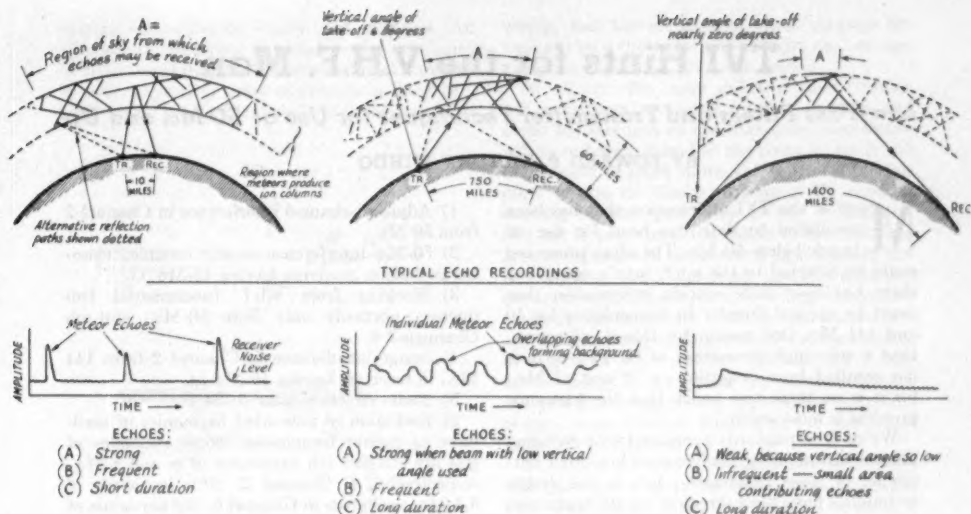


Fig. 5 — Effect of distance on meteor echo behavior, for a given frequency and power.

tance is near the maximum for one-hop *E*-layer reflection: about 1400 miles. During the course of a 15-minute transmission, only one or two distinct bursts were heard. His antenna, location and equipment are top-flight, as his DX record shows, so the conclusion seems to be that at extreme range the number of meteors which can produce a signal over the path (they have to be just about exactly over the midpoint) becomes so small that a continuous background is not supported. Also, the angle of take-off becomes so low (down around one degree) that antennas of practicable height are quite inefficient. The effect of varying transmitter-receiver distance, with frequency and power constant, is shown in Fig. 5.

#### Relationship to 50-Mc. Scattering

The theoretical investigations which followed these ham experiments confirm the expectation that meteors alone can support the entire signal.<sup>5,6</sup> However, the possibility that other factors may be involved can by no means be ruled out. There has recently been published an account of another new form of propagation, in many respects resembling that discussed in this article, which is effective at frequencies of the order of 50 megacycles and at very high power levels.<sup>7</sup> It is suggested that this propagation may be explained as forward-scattering

from irregularities such as might be caused by turbulence in the *E* region of the ionosphere. Meteors are cited as playing an important part. The observed signal, however, has certain characteristics for which meteors would almost certainly not be responsible.

These characteristics, unhappily, are not easy to study at 15 megacycles. It is not yet known to what extent, if any, the 15- and 50-megacycle signals are caused by the same agency. The situation as of December, 1952, may be summarized in the following way. At the lower frequency, theory indicates that meteors alone should easily account for the observed signal. Nothing in the experimental evidence thus far disagrees with this conclusion. At 50 megacycles, however, the theory—based on present knowledge of meteor echo behavior—predicts that they alone will not be sufficient to account for what is observed. It appears that other factors must be sought.

The unscrambling of the several factors which may contribute to the signal observed at the two frequencies will be an exciting and challenging job. One of the first tasks will be to gain as much experience with these new types of propagation as possible. Here the amateurs, with their wide geographical distribution, and their willingness to experiment at all hours of the day and night, are in a position to make a real contribution. It is obvious that any means for making the 20-meter band work around the clock (at least for 800-mile QSOs!) is going to be important as crowding on the lower frequencies increases. Furthermore, the invulnerability of meteors to ionospheric storms is another important point: a weak, but really reliable circuit may, during emergencies, be worth much more than one which could fade out at the crucial moment.

(Continued on page 124)

<sup>5</sup> O. G. Villard, Jr., A. M. Peterson, et al., "Extended-Range Radio Transmission by Oblique Reflection from Meteoric Ionization," *Journal of Geophysical Research*, March, 1953 (in press).

<sup>6</sup> Von R. Eshleman and L. A. Manning, "Radio Communication by Scattering from Meteoric Ionization," Technical Report No. 57, Electronics Research Laboratory, Stanford University, Stanford, Calif., December 1, 1952.

<sup>7</sup> D. K. Bailey, et al., "A New Kind of Radio Propagation at Very High Frequencies Observable over Long Distances," *Physical Review*, Vol. 86, pp. 141-145, April 15, 1952.

# TVI Hints for the V.H.F. Man

## Low-Pass Filters and Transmitter Techniques for Use at 50 Mc. and Up

BY EDWARD P. TILTON,\* WHDQ

**M**ost of the TVI information that has been published to date has been for use on bands below 50 Mc. The ideas presented could be adapted to the v.h.f. man's needs, but there has been little specific information that could be applied directly to transmitters for 50 and 144 Mc. One reason for this is, of course, that a very high percentage of all TVI to date has resulted from operation on 28 and 14 Mc., for it is on these two bands that the harmonic problem is most severe.

We've been primarily concerned with reducing the amount of energy radiated on low-order harmonics of these frequencies, too, so the design techniques have been directed toward harmonics falling in Channels 2 through 6. Even in the case of 28-Mc. operation, the lowest harmonic that could cause trouble in the high channels is the seventh, so shielding and filtering methods that cut out the more troublesome low-band harmonics are almost always effective in the high band, too. With v.h.f. operation, however, the problems may be quite different. The 50-Mc. operator has a 4th-harmonic possibility in Channels 11, 12 or 13, and tripler stages multiplying to 144 Mc. can create quite a rumpus in Channels 9 and 10. Though the amount of TVI thus far resulting from use of the v.h.f. bands is relatively small, there is certain to be more before long as more TV stations begin using the high-band assignments. U.h.f. TV now bursting forth on a commercial scale cannot be expected to make life any easier for the v.h.f. operator.

### Sources of V.H.F. TVI

Just as with our lower bands, before we can do anything about reducing v.h.f.-caused TVI we must be sure of the nature of the problem. Unless we know what is causing the interference we will be very lucky if we happen onto a solution. Experience has shown that the principal sources of TVI from v.h.f. rigs are as follows:

\* V.H.F. Editor, *QST*.

- 1) Adjacent-channel interference in Channel 2 from 50 Mc.
- 2) 50-Mc. interference on any occupied channel in certain receivers having 45-Mc. i.f.
- 3) Blocking from v.h.f. fundamental frequency, normally only from 50-Mc., and on Channels 2-6.
- 4) Image interference in Channel 2 from 144 Mc., in receivers having 45-Mc. i.f.
- 5) Audio effects similar to BCI.
- 6) Radiation of unwanted harmonics of oscillator or exciter frequencies. Some examples of this are 9th and 7th harmonics of 6- and 8-Mc., respectively, in Channel 2, 10th harmonic of 8.4-Mc. oscillators in Channel 6, 3rd harmonic of 25.5 Mc. or higher in Channel 3, 7th harmonic of 25-Mc. stages in Channel 7, and 4th harmonic of 48-Mc. triplers in Channels 9 or 10. These are just examples; there may be other combinations.
- 7) 4th harmonic of 50-Mc. operating frequency, in Channels 11, 12 or 13.
- 8) Various harmonics of 50 or 144 Mc. falling in the u.h.f. range, Channels 14 through 83.

The first five categories are receiver faults. Nothing can be done at the transmitter to correct the first four items, other than to reduce power or increase the separation between the transmitting and TV receiving antennas. Corrective measures that can be applied to the receiver will be discussed later; what we are concerned with for the present is the transmitter, and steps we can take to reduce its TVI potentiality. Item 5 is a receiver condition, too, but it can be eliminated at the transmitter end by avoiding the use of amplitude modulation. Frequency modulation or c.w. will do the trick ordinarily.

The radiation of unwanted harmonics of exciter frequencies (Item 6) is a common cause of TVI, particularly where the transmitter is operated in close proximity to TV receivers. In an open layout there is little that can be done to correct this, so the first step is thorough shielding, if the exciter frequencies cannot be shifted to avoid



A low-pass filter for use with a high-powered 50-Mc. transmitter. Though variable condensers are used, they are not adjusted in normal operation, and shafts should be anchored in place with lacquer to prevent their being moved accidentally.

having harmonics in locally-used channels. An example of the latter approach is the avoidance of 8-Mc. crystals in 50-Mc. work where Channel 6 is used. Crystal or other oscillators in the 8-Mc. range may produce sufficient 10th harmonic to

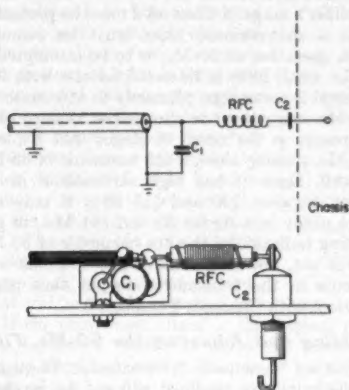


Fig. 1—Filter method for suppressing high-band harmonics that might otherwise be radiated from power cabling. A typical physical arrangement is shown in the sketch.

C<sub>1</sub>—0.001- $\mu$ fd. miniature disk ceramic.  
C<sub>2</sub>—0.001- $\mu$ fd. feed-through by-pass (Erie Style 326).  
(For 500-2000-volt lead, substitute Plasticon Glass mike, LSG—251, for C<sub>1</sub> and C<sub>2</sub>.)  
RFC—14 inches No. 26 enamel close-wound on 3/16-inch diam. form or resistor.

interfere in Channel 6, but shifting to a 6-Mc. oscillator moves the harmonics to other channels that may not be used locally.

Often the interfering harmonics will be passed on through succeeding stages, particularly with the capacity-coupled circuits so often used in frequency multipliers, so shielding alone may not effect a cure. But just as with other forms of harmonic trouble, shielding is the first step in a corrective program. You have to have it before other measures will work.

#### The More Stubborn Cases

What to do from here on depends on the severity of the problem. If your harmonic TVI (either from exciter stages or the final operating frequency) is just a matter of faint cross-hatching, it is quite possible that shielding the rig and installing an antenna coupler fed with coaxial line<sup>1</sup> may clear it up, as these simple steps are capable of holding down radiation of the harmonic by the antenna system to quite low levels.

If these measures make little or no change in the intensity of the interference, filtering of the power cables is next in order. As simple a matter as by-passing power leads where they are brought out of the transmitter enclosure may help, though use of shielded wire for interior power

wiring, and the addition of small ceramic by-passes where the leads are brought out, as suggested by Grammer,<sup>2</sup> is much better.

In all but the more difficult cases, trouble will have been corrected by now, and in any event the strength of the harmonic interference will have been reduced to the point where it will be possible to track down the source. The simplest way to do this is to have a TV receiver running in close proximity to the transmitter, and use it as a visual indication of the effectiveness of suppression measures. A probing lead can be clipped to the TV antenna lead (no electrical connection; just the capacity coupling will suffice) to check for harmonic leaks in the transmitter and its associated cabling. Couple the transmitter to a lamp or other dummy load and see if harmonic energy is present in the antenna line. If the power cabling shows appreciable harmonic energy, more effective filtering of the individual leads will be required.

The use of shielded wire and ceramic by-passes will take care of most low-band harmonic radiation from power leads, but where Channels 7 through 13 are involved, something better may be needed. The exciter and amplifier described by the writer in *QST* for September and December serve as a good example. This combination was substantially free of harmonic TVI in the low channels, but when it was operated on 50 Mc. in the presence of a weak signal on Channel 11 it wiped the picture completely out with its fourth harmonic. Furthermore, it did it with only the exciter running.

The probe test showed that the power cable was hot with 200-Mc. energy, so the filter circuit of Fig. 1 was installed in each power lead. Even the smallest by-pass condensers of conventional construction have sufficient lead inductance to make them relatively ineffective at 200 Mc., so feed-through capacitors were used at C<sub>2</sub>. Then small v.h.f. chokes were inserted in series with the leads, and the ceramic by-passes left as they were originally, connected as shown in Fig. 1 and the photograph on page 17 of April, 1951, *QST*. These methods are not applicable to leads carrying more than about 400 volts, so we had to settle for something a bit less effective on the feed-through terminal for the 4-250A plate voltage. Here a high-voltage by-pass of the most compact construction we could find was mounted as close as possible to the feed-through bushing, and the connection made to it with copper strap to hold down lead inductance. There was still a faint trace of harmonic left on the terminal and cable, but it did not interfere seriously except when the probe was held near the lead or terminal. These Channel 11 tests were made with a very snowy signal, with the 50-Mc. transmitter only six feet away from the receiver, running inputs up to 750 watts.

Shielding requirements were more stringent for the 200-Mc. harmonic than for lower frequencies. The covers on both units had to be screwed down tightly all the way around, as the slightest crack leaked enough 200-Mc. r.f. to

<sup>1</sup> Antenna couplers for 50 and 144 Mc. were described in *QST* for October, 1952, p. 58, and January, 1952, p. 50.

<sup>2</sup> Grammer, "By-Passing for Harmonic Reduction," *QST*, April, 1951, p. 17.

cause trouble. A hole in the side of the chassis for the ventilating fan, a source of no troublesome harmonic radiation at 54 to 86 Mc., had to be covered with screening to contain the 200-Mc. harmonic.

### Low-Pass Filters for 50 and 144 Mc.

Having gotten the level of the harmonic radiation on Channels 2 through 13 down to the point where very little could be found other than in the transmitter output load, we were ready to go to work on low-pass filters designed especially for the v.h.f. man. The filters shown in the photographs were designed according to information presented about two years ago in *QST*.<sup>3</sup> They

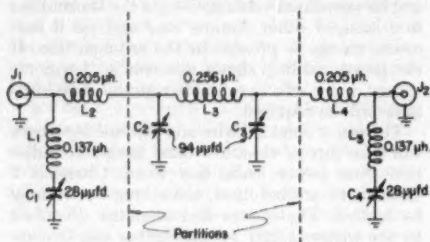


Fig. 2—Schematic diagram of the 50- and 144-Mc. filters. No partitions are built into the 144-Mc. unit. Values on the drawing are for the 50-Mc. filter.

C<sub>1</sub>, C<sub>4</sub>—50 Mc.: 50-μfd. variable, shaft-mounted, set to middle of tuning range (Johnson 50L15).  
144 Mc.: 11-μfd. fixed ceramic (10-μfd. useable).

C<sub>2</sub>, C<sub>3</sub>—50 Mc.: 100-μfd. variable, shaft-mounted, set with rotor  $\frac{1}{4}$  inch out of stator (Bud MC-905).  
144 Mc.: 38-μfd. stand-off by-pass (Eric Style 721A).

#### 50-Mc. coil data:

L<sub>1</sub>, L<sub>5</sub>—3½ turns  $\frac{5}{8}$  inch long. Top leads  $\frac{3}{4}$  inch, bottom leads  $\frac{1}{4}$  inch long.

L<sub>2</sub>, L<sub>4</sub>—4½ turns  $\frac{5}{8}$  inch long. Leads  $\frac{1}{2}$  inch long each end.

L<sub>3</sub>—5½ turns  $\frac{7}{8}$  inch long. Leads 1 inch long each. All 50-Mc. coils No. 12 tinned,  $\frac{1}{2}$ -inch diam., coil length measured between right-angle bends where leads begin.

#### 144-Mc. coil data:

L<sub>1</sub>, L<sub>5</sub>—3 turns  $\frac{1}{4}$  inch long. Leads  $\frac{1}{4}$  inch long each end.

L<sub>2</sub>, L<sub>4</sub>—2 turns  $\frac{1}{2}$  inch long. Leads 1 inch long each end.

L<sub>3</sub>—5 turns  $\frac{3}{4}$  inch long. Leads  $\frac{1}{4}$  inch long each end. All 144-Mc. coils No. 18 tinned,  $\frac{1}{4}$ -inch diam., lengths measured as for 50-Mc. coils.

J<sub>1</sub>, J<sub>2</sub>—Coaxial fitting.

use standard parts, and the adjustment procedure is simple enough if one has access to a grid-dip meter. Even without adjustment it is quite possible to achieve satisfactory results with these filters if the physical and electrical specifications given are followed closely.

The larger of the two is suitable for use with the high-powered amplifier for 50, 28 and 21 Mc., described in December *QST*, providing protection of Channels 3 through 13. Appreciable

attenuation across the whole of Channel 2 is not practical for a filter that will also pass the 50-Mc. band without insertion loss. Any of the commercial filters, or the various designs that have appeared in *QST* and the *Handbook*, can be used to reduce harmonics of the two lower bands in the amplifier's range, if Channel 2 must be protected. Such a conventional filter must be removed when operation on 50 Mc. is to be attempted.

The small filter is intended for use with low-powered 2-meter rigs, primarily to attenuate the 192-Mc. component in the output that so often is present as the result of stages that triple to 144 Mc. passing along a 4th harmonic of 48 Mc. as well. Since it has high attenuation in the region between 190 and 215 Mc., it may also serve nicely in a rig for 50 and 144 Mc., in preventing radiation of the 4th harmonic of 50 Mc. It will not, however, remove any spurious components in the transmitter output that might interfere with Channels 2 through 6.

### Building and Adjusting the 50-Mc. Filter

This is a "how-to-do-it" treatment. Discussion of the principles involved will not be repeated here, but it is strongly recommended that anyone unfamiliar with filter fundamentals read basic information on this subject that has already been presented.<sup>3</sup> The material to follow will concern itself only with the practical application of earlier design ideas to the needs of the v.h.f. operator, giving only the practical information that will be necessary to insure duplication of the results achieved with the two filters shown.

The circuit used in both filters is shown in Fig. 2, with values of inductance and capacitance for the 50-Mc. job given on the diagram. If means for arriving at these precise values are available, the components can be preset and the filter assembled and used without further adjustment. A method of using a grid-dip meter and simple standards for measurement of both *C* and *L* was outlined recently in *QST*.<sup>4</sup> If the builder is in doubt of his ability to do this, or if he does not have access to a grid-dip meter, a satisfactory job can be done by using exact duplicates of the parts and layout, and setting the condenser plates at the positions shown in the interior photograph.

The 50-Mc. filter case is a standard ICA box (Slip Cover, No. 29100), though a suitable container can be made from the dimensions given in the layout drawing, Fig. 3. Physical layout of parts is important, if results obtained with the original are to be duplicated without extensive adjustments. It is suggested that the drawing and photographs be studied carefully with this in mind.

Looking at the interior view, it will be seen that the two end condensers, C<sub>1</sub> and C<sub>4</sub>, are mounted with their two stator posts toward the ends of the filter. The two larger units are mounted in the center compartment with their rotor shafts toward the middle. The top leads from coils L<sub>1</sub> and L<sub>5</sub> are wrapped around the stator terminals of C<sub>1</sub> and C<sub>4</sub>, and the bottom

<sup>3</sup> Grammer, "Eliminating TVI with Low-Pass Filters," *QST*, Feb., March, April, 1950.

<sup>4</sup> Grammer, "Inexpensive *L* and *C* Standards," *QST*, Jan., 1953, p. 48.

leads fit directly into the coaxial input and output fittings. The outer ends of coils  $L_2$  and  $L_4$  are soldered to the coaxial fitting terminals, and their inner ends are soldered to lugs supported on one-inch ceramic stand-off insulators. Leads from the stand-offs go through holes in the partitions to the bottom stator lugs on  $C_1$  and  $C_3$ .  $L_3$  is soldered to the two upper lugs on these two capacitors, thus completing the filter circuit. Note that in addition to turns data, lead lengths for the coils are given in the parts list. These are the total lengths to be left when the winding is completed, including the portions that will be used in soldering operations.

If the components used in the original model are duplicated exactly it should be possible to set up the filter without the use of instruments and obtain usable results, though following through on the recommended adjustment procedure is a much more satisfactory approach. Using standard coils and condensers and a grid-dip meter in the manner outlined by Grammer,<sup>4</sup> the coils and condensers in the filter assembly were adjusted to the values given in the schematic diagram. The value of  $28 \mu\text{fd.}$  for  $C_1$  and  $C_4$  came at almost exactly the middle of their adjustment range.  $C_2$  and  $C_3$  reached  $94 \mu\text{fd.}$  with their rotors extending out of the stators about  $\frac{1}{4}$  inch on the side of the condensers nearest the wall of the filter case.

With these settings the filter attenuation curve begins to rise at about 55 Mc., reaching its peak in Channel 6 but providing a useful degree of attenuation in all channels from 3 up. The rejection is high all across the high band, 175 to 220 Mc. This range takes care of most of the spurious

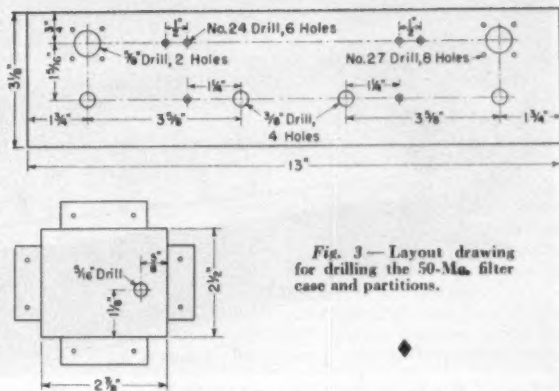


Fig. 3—Layout drawing for drilling the 50-Mc. filter case and partitions.

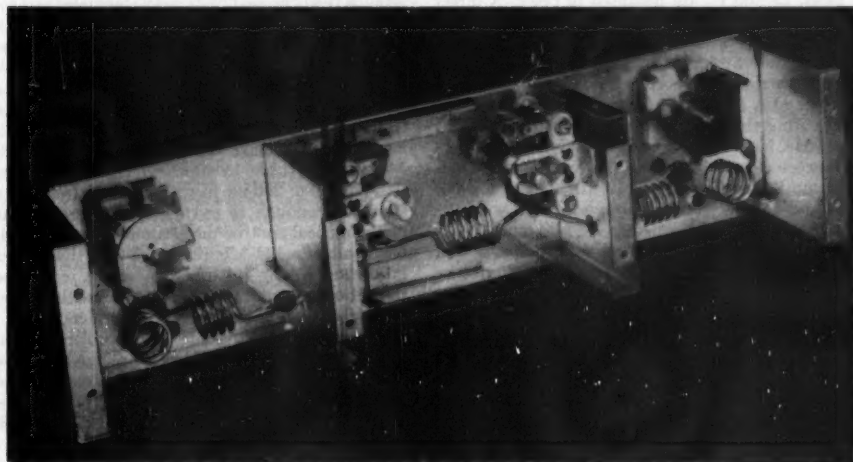
frequencies that are likely to be generated in a 50-Mc. transmitter, and it will handle all harmonics in the TV range from lower amateur frequencies as well, except those falling in Channel 2.

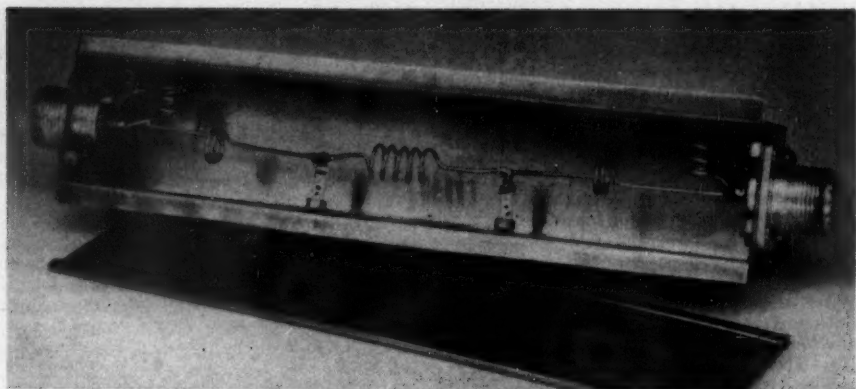
### The 2-Meter Filter

Values of inductance needed in a 2-meter filter are too small to be very readily obtained by the methods outlined for the 50-Mc. job, so a somewhat different approach is used. The filter was made in sections, using capacity values determined in advance and then adjusting the inductances to achieve resonance at the desired frequencies.

The case for the small filter was made of flashing copper. Dimensions are not particularly critical, but in this instance the box is  $1\frac{1}{4}$  inches square and  $7\frac{1}{2}$  inches long. The main portion of the case is cut from a single piece of copper, with the end tabs folded down and soldered to the sides. Flanges are folded over at the bottom, and a cover is made to slip over these. Details of the

Interior view of the 50-Mc. low-pass filter. End sections are of identical construction.





Low-pass filter for use with low-powered 144-Mc. transmitters. Maximum attenuation is in the region of 190 to 215 Mc., but good from 170 Mc. up.

construction are visible in the photograph. Coaxial fittings are mounted in the middle of each end piece.

Optimum capacitance values figured out to be 11  $\mu\text{fd.}$  for the end sections and 38  $\mu\text{fd.}$  for the middle ones. If a device for measuring capacity values accurately is available, standard 10- and 35- or 39- $\mu\text{fd.}$  units can be measured and those coming nearest the desired values used. Stand-off type by-passes are ideal for this sort of work because of their minimum lead inductance, but suitable values of that kind of unit were not available for the end sections, so ordinary "dog bone" ceramics were used for  $C_1$  and  $C_4$ . Several of these were measured and two nearest to 11  $\mu\text{fd.}$  were selected. The center capacitors,  $C_2$  and  $C_3$ , were stand-off units marked for 35  $\mu\text{fd.}$ , though the actual value was slightly higher. Values as much as 10 per cent away from the optimum given under Fig. 2 should not make a large difference in results, if the adjustment procedure outlined below is followed.

The filter is assembled and adjusted in sections. First,  $L_1$  and  $C_1$  are mounted in place. A direct short is made across the input connector,  $J_1$ , and the inductance of  $L_1$  is adjusted so that it and  $C_1$  resonate at 200 Mc. Then, connect in  $L_2$  and  $C_2$ , removing the short from  $J_1$ . The circuit including  $C_1$ ,  $L_2$ ,  $L_1$  and  $C_2$  should be adjusted (by adjusting the turn spacing of  $L_2$ ) to resonate at 144 Mc. Now disconnect  $L_2$  from  $C_2$  and mount  $L_3$  between  $C_2$  and  $C_3$ . Adjust the turns of this winding until it resonates at 112 Mc. Mount  $L_4$  and  $C_4$  and adjust, as for the opposite end, with the coax terminal,  $J_2$ , shorted. Add  $L_4$  and  $C_3$ , as for the other end. Now connect all parts and check resonance with the grid-dip meter. The dip, all through the filter, should now be at about 160 Mc., the approximate cut-off frequency.

#### How About U.H.F. TV?

Tests conducted in the ARRL lab and elsewhere, and results so far obtained in Portland and Bridgeport, the only two areas where u.h.f. TV has been in operation for extended periods,

indicate that the advent of u.h.f. TV generally will alleviate rather than increase our TVI problems. Certainly this is true for the user of the frequencies below 30 Mc. The order of harmonic, even from 28 Mc., that will appear in the u.h.f. TV range is so high that there should not be much trouble ordinarily. The 4-250A rig on 28 Mc. made no TVI in a lab u.h.f. check.

The v.h.f. man is more likely to run into TVI trouble, however, as the order of his harmonics in the u.h.f. range is not so high. No means were available for checking the attenuation of the filters described at frequencies higher than 250 Mc., but indications obtained with various u.h.f. TV receiving set-ups are that the filters help materially when harmonics do show up.

The crystal diodes commonly used as mixers in u.h.f. TV receivers have the unhappy faculty of generating harmonics on their own, when strong r.f. fields are present. Preliminary checks indicate that harmonics up to the 10th or higher may be generated in this way. Like the first five items listed on page 16, this is a receiver fault. As such it will be dealt with in a subsequent article.

There is one aspect of u.h.f. TV that should make our problems somewhat simpler than those we've learned to live with in our experience with Channels 2-13: Where high-order harmonics are involved, a small change of transmitter frequency shifts the offending harmonic out of a locally-used channel. The 10th harmonic of 50 Mc. is the first one to appear in the u.h.f. range, so a change of 200 kc. in the operating frequency should be enough to move the interference out of the critical spot in the channel. Even the 4th harmonic of a 144-Mc. rig, the lowest that could interfere directly with a TV signal, could be moved out of trouble in Channel 31 without too great a change at the operating frequency.

We will run into some new problems when u.h.f. TV gets going in high gear, but after the progress we've made in the last few years, who can doubt that any troublesome circumstances arising from u.h.f. expansion will be solved in short order?

# Folded and Loaded Antennas

*Suggestions for Mobile and Restricted-Space Radiators*

BY WILLIAM B. WRIGLEY,\* W4UCW

\* Using a simplified method of calculation, the author develops values for the radiation resistance of various folded and loaded forms of short antennas. Several interesting possibilities for small radiating systems are discussed.

WHILE we are all quite familiar with the half-wave folded dipole, its radiation pattern, input or radiation impedance, and application to amateur installations, it seems that there are many more folded configurations which are not well known and which may prove quite surprising in their usefulness. Most of us are also reasonably familiar with the basic methods of loading mobile antennas, but we may be surprised at what a few simple calculations can tell us about the effects of various methods of loading.

First let us consider the basic half-wave thin dipole<sup>1</sup> with a theoretical balanced center-feed impedance of about 72 ohms. Fig. 1A shows such an antenna with its current distribution (dashed line) and charge distribution (solid line). While these distributions are not exactly sinusoidal as shown, the assumption that they are so introduces negligible error in impedance and field-pattern calculations, and at the same time reduces these calculations from formidable complexity to fairly simple operations. Now Fig. 1B shows what happens if we attempt to operate this antenna at the second harmonic. We now have a condition of antiresonance. The input resistance is much higher and the reactance variation with frequency is much greater than in the original resonant case at the fundamental frequency. Fig. 1C shows the

current distribution at the third harmonic, where we once again have a reasonably broad resonant condition. Fig. 2 shows qualitatively this same information as resistance and reactance plotted against antenna length in wavelengths.

We might conclude from all this that, at least in the symmetrical case, an antenna will be reasonably broad-band only at frequencies where

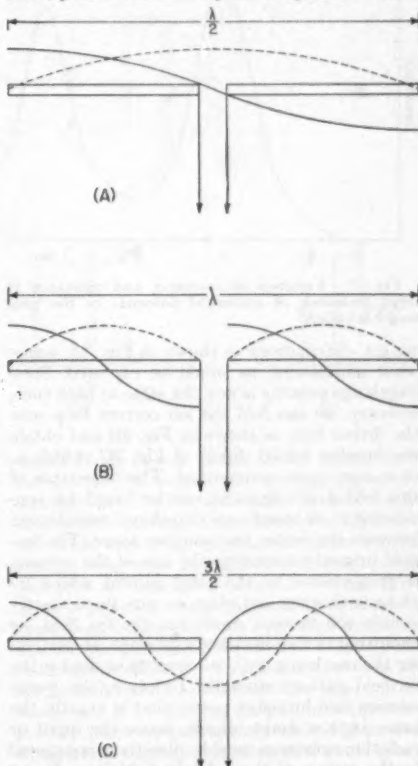


Fig. 1 — Current and voltage distribution on half-, one-, and one and one-half wavelength antennas, fed at the center.

the length is an odd number of half-wavelengths or such that the feed point is at a current maximum.

Why can we not simply move the feed point to a current maximum in the second-harmonic case of Fig. 1B? We can, in fact, but then things change somewhat since the now-continuous center cannot support a discontinuity in charge. So

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<sup>1</sup> Edron's Note: As some readers may not be familiar with the terms used here, the following may be helpful:

A "thin" antenna is one having a very large ratio of length to conductor diameter, approaching infinitely-small diameter; practically, a wire antenna at low frequencies is "thin" but a 10-meter beam element is fairly "thick." The thickness affects the resonant length, radiation resistance, and sharpness of tuning.

"Antiresonance" is the same as parallel resonance; in the antenna case, it is the condition that exists when a resonant antenna is viewed at a voltage loop.

"Charge" and "charge distribution" are equivalent to "voltage" and "voltage distribution."

The "far field" is the radiation field at a large distance from the antenna — so far that the waves may be considered to be plane waves, and, of course, far beyond the region where the induction field is of any consequence.

A "monopole" is one-half of a dipole; e.g., a grounded antenna or one in which a ground plane is substituted for actual ground.

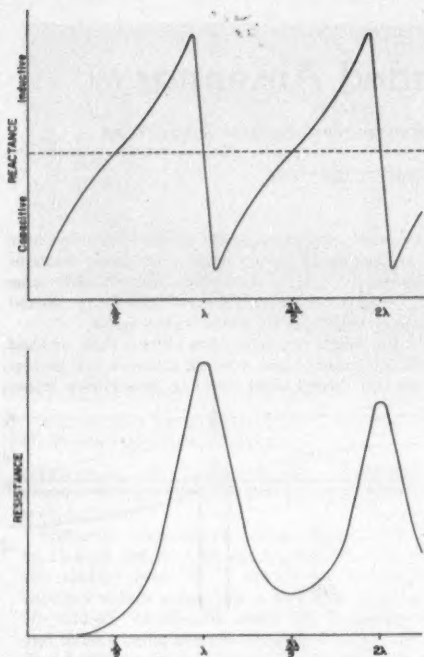


Fig. 2—Variation of reactance and resistance at input terminals of center-fed antennas as the total length is varied.

we get distributions as shown in Fig. 3A, somewhat unbalanced, as would be expected. Since the charge polarity is now the same at both ends, however, we can fold the left current loop over the driven loop as shown in Fig. 3B and obtain the familiar folded dipole of Fig. 3C, which is, of course, quite symmetrical. The impedance of this folded arrangement can be found by considering it as merely an impedance transformer between the feeder line and free space. The far-field intensity normal to the axis of the antenna is proportional to the total current added up along both wires and, since we now have exactly double the current producing the far field, as compared to that in either wire alone (in particular the one being fed), we must have double the far-field pattern strength. However, the transmission line furnishes power that is exactly the same as in a simple dipole, hence the input or radiation resistance must be directly proportional to the square of the total far-field intensity as compared to that of the fed wire only ( $W = E^2/R$ ). In this case  $2^2 = 4$  and  $4 \times 72$  is 288 ohms, which is the approximate theoretical radiation resistance of a thin folded half-wave dipole. It is well known that the reactance-frequency variation of the antenna is, in this particular case, partially cancelled out by the opposite variation of the two transmission line stubs in series seen from the feed point such that the

folded dipole has, in fact, broader bandwidth than the single thin dipole.

### Other Folded and Loaded Systems

Since this folding operation has proved so attractive, let us now investigate the possibility of folding the configuration of Fig. 1A. Because of the mobile antenna application we shall consider half the antenna of Fig. 1A against a ground plane and fed with a coaxial cable as shown in Fig. 4A. We can fold the antenna as in Fig. 4B and obtain the eighth-wave folded monopole of Fig. 4C.<sup>2</sup> Since the opposite ends of the original dipole were at opposite charge polarity (Fig. 1A), we must leave these ends unconnected upon folding; or, in the ground plane case, the folded-over section must not be allowed to contact the ground plane. For radiation purposes, the current in the folded section is opposite in direction

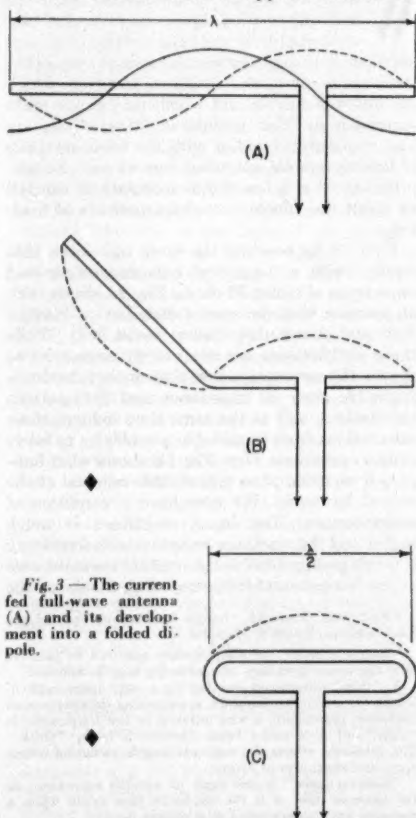


Fig. 3—The current fed full-wave antenna (A) and its development into a folded dipole.

to that of the unfolded half and one must be subtracted from the other, resulting in the radiation current distribution shown in Fig. 4D.

Now in the folded dipole case we found the impedance by adding (mathematically integrating) the current distribution along the wire to obtain a figure proportional to far-field strength.

<sup>2</sup> Lindenblad, "Television Transmitting Antenna for Empire State Building," *RCA Review*, 3, p. 400, April, 1939.

Actually, these figures of proportionality are only valid comparisons of two antennas if the far-field patterns or current distributions are identical. However, in all the cases we shall consider here, there will be only one combined radiating current loop and hence only one far-field pattern lobe. These lobes will not be exactly the same shape, but to assume them so is a reasonable approximation as evidenced by the fact that the far-field radiation pattern of a half-wave dipole with sinusoidal current distribution is only slightly more directive (78 degrees between half-power points) than that of a minutely short dipole with uniform current distribution (90 degrees between half-power points).

As shown by the calculations in the Appendix, the approximate radiation impedance of the folded eighth-wave monopole of Fig. 4D is 6.2 ohms. A similar analysis of a bottom-loaded eighth-wave monopole, Fig. 4E, shows that its radiation resistance also is 6.2 ohms, which is the same as for the folded case! This identity holds for a quarter-wave monopole which is folded into any even number of elements as compared to a bottom-loaded single element of the same actual height.

Fig. 4F shows the current distribution of a top-loaded eighth-wave monopole.<sup>3</sup> The approximate radiation resistance, as shown in the Appendix, is 18 ohms. For the center-loaded eighth-wave monopole of Fig. 4G the approximate method of calculation still applies and leads to a theoretical radiation resistance of 11.5 ohms.

#### Folded Mobiles

Fig. 4D could be interpreted as a 20-meter mobile antenna made up of two adjacent eight-foot whips. One significant advantage of this arrangement is that there is no loading-coil loss to contend with. A further advantage is in the realization that a shorted stub of appropriate length ( $\frac{\lambda}{4}$  at 20 meters) connected to the mounting point of the folded or second whip will be an open

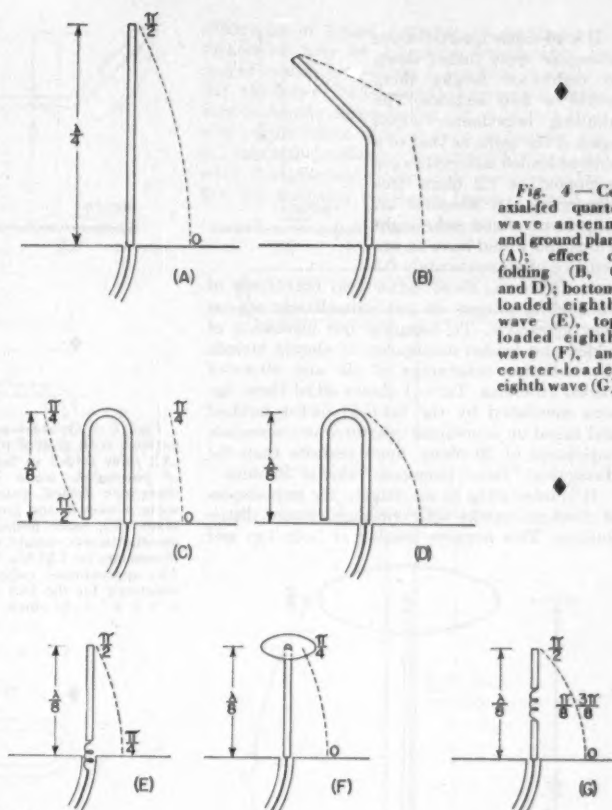


Fig. 4—Coaxial-fed quarter wave antenna and ground plane (A); effect of folding (B, C and D); bottom-loaded eighth-wave (E), top-loaded eighth-wave (F), and center-loaded eighth wave (G).

circuit at 20 meters and a closed circuit at 10 meters. At 10 meters the system becomes a quarter-wave folded monopole (half a folded dipole) with an input impedance of a little over 100 ohms, while at 20 meters, with no mechanical change, it becomes an eighth-wave folded monopole with an impedance of about 5 ohms. (Five ohms is probably closer than the theoretical 6.2 ohms since mobile quarter-wave whips look more like 30 than 36 ohms. They are not "thin.") The rather severe difference in impedance between the fundamental and second-harmonic case can be taken care of by feeding the pair of whips with another quarter-wavelength of cable at 20 meters. Being a half-wave at 10 meters, this would give a load impedance at the transmitter of somewhat over 100 ohms at 10 meters and  $\frac{Z_0^2}{5}$  ohms at 20

meters, where  $Z_0$  is the characteristic impedance of the cable used. This double whip 10-20 system will be slightly more selective, however, than either of the plain folded monopoles, since the reactance deviation with frequency of the shorted stub is opposite in sign from that required to counteract the reactance deviation of the antenna.

<sup>3</sup> Terman, *Radio Engineers' Handbook*, McGraw-Hill Book Co., Inc., New York, 1943, par. 11, sec. 11.

If a 40-meter quarter-wave monopole were folded down to eight-foot height there would be four sections. The resulting impedance, which again is the same as that of a bottom-loaded sixteenth-wave monopole, is 1.2 ohms (see Appendix). An 80-meter arrangement would take eight whips and would have an impedance of approximately 0.3 ohm. However, these latter two extensions of the folding process do not immediately appear very attractive. To complete our discussion of folded and loaded monopoles we should include the radiation resistances of 40- and 80-meter loaded antennas. Table I shows all of these figures calculated by the far-field factor method and based on a nominal quarter-wave monopole impedance of 30 ohms, more realistic than the theoretical "thin" monopole value of 36 ohms.

It is interesting to investigate the impedances of short monopoles with optimum current distributions. This requires loading at both top and

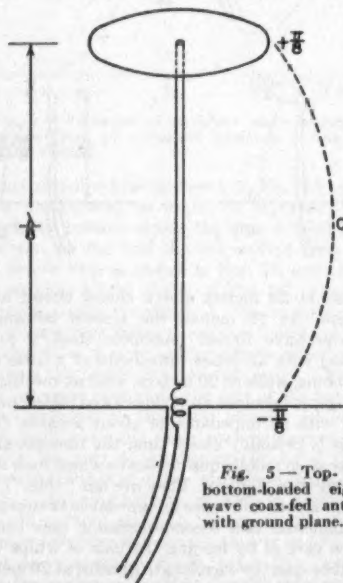


Fig. 5—Top- and bottom-loaded eighth-wave coax-fed antenna with ground plane.

bottom so as to center the current loop on the antenna as shown in Fig. 5. The values of radiation resistance for 40 and 80 meters are also included in Table I.

A top- and bottom-loaded (current loop centered) 10-meter quarter-wave monopole has the very attractive impedance of 120 ohms, calculated by this method. The ground current losses in it would be considerably less than the losses in the unloaded case for the same radiated power.

<sup>4</sup> Jordan, *Electromagnetic Waves and Radiating Systems*, Prentice Hall, Inc., New York, 1950, pp. 510-517.

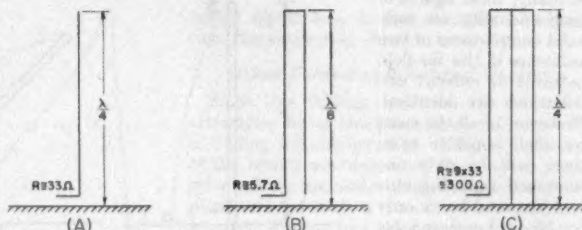
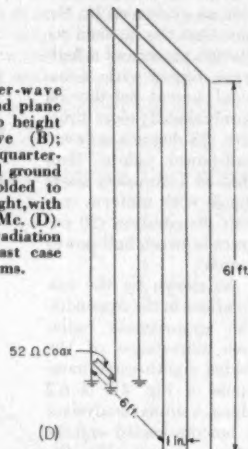


Fig. 6—Quarter-wave antenna with ground plane (A); same folded to height of one-eighth wave (B); three-wire folded quarter-wave monopole and ground plane (C); same folded to one-eighth-wave height, with dimensions for 1.85 Mc. (D). The approximate radiation resistance for the last case is  $9 \times 5.7 = 51$  ohms.



#### Comparisons

We can now draw some very definite conclusions regarding the merits of various loading schemes. Since the principal loss in a vertical radiator (outside of the loading-coil loss) is due to ground currents,<sup>4</sup> the efficiency rapidly decreases with decreasing radiation resistance. For constant radiated power, the current must be greater for smaller values of radiation resistance. Greater current means greater loss and consequent reduc-

TABLE I

Approximate radiation resistance of various loaded and folded monopole antennas based on a quarter-wave value of 30 ohms

Electrical height	$\frac{\lambda}{8}$	$\frac{\lambda}{16}$	$\frac{\lambda}{32}$
Wavelength for mobile			
8-foot whip.....	20 meters	40 meters	80 meters
Radiation resistance, top-and-bottom-loaded	21 ohms	4.7 ohms	1.2 ohms
Radiation resistance, top-loaded.....	15 ohms	4.4 ohms	1.1 ohms
Radiation resistance, center-loaded.....	9.6 ohms	2.5 ohms	0.67 ohm
Radiation resistance, bottom-loaded or folded.....	5.2 ohms	1.2 ohms	0.29 ohm

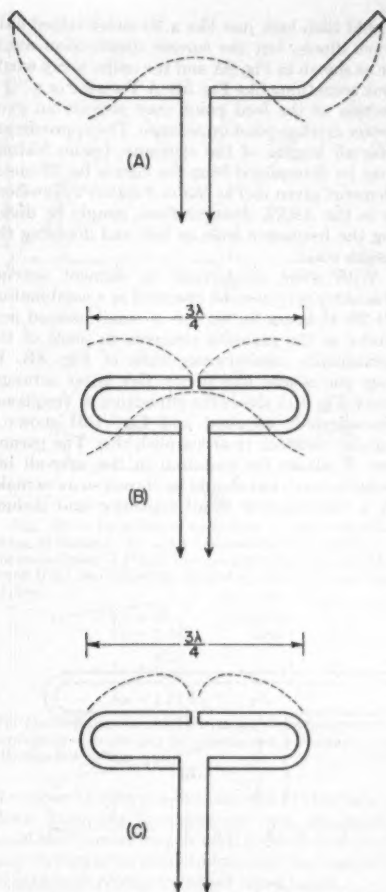


Fig. 7—Center-fed antenna one and one-half wavelengths long (A) folded into a three-quarter-wave folded dipole (B and C).

tion in efficiency; therefore, the power loss in a center-loaded eighth-wave monopole is more than that of a top-loaded equivalent antenna and the loss in the bottom-loaded case is more than that of the center-loaded case. A combination of both top and bottom loading, however, gives a radiation impedance which in some cases reduces the loss to an exceptionally low value compared to that of the bottom-only loaded, folded, or unloaded case. Sufficient top loading is usually impractical, however, particularly in the case of very short monopoles.

The main conclusion we can draw from all these calculations is that short antennas (monopoles less than one-tenth wavelength) have uncomfortably low radiation resistances and practically nothing can be done to improve their efficiencies to a reasonable value, except possibly by using a multiwire system to raise the impedance as described earlier. On the other hand, the

efficiencies of longer (quarter- or eighth-wave) monopoles may be increased considerably by proper loading, or folding. A practical example is the 160-meter folded eighth-wavelength three-wire monopole shown in Fig. 6B. Adding a third wire to the folded quarter-wave monopole, Fig. 6C, raises the resistance to about 300 ohms, and when this antenna is folded over as shown in Fig. 6D, the radiation resistance becomes about 50

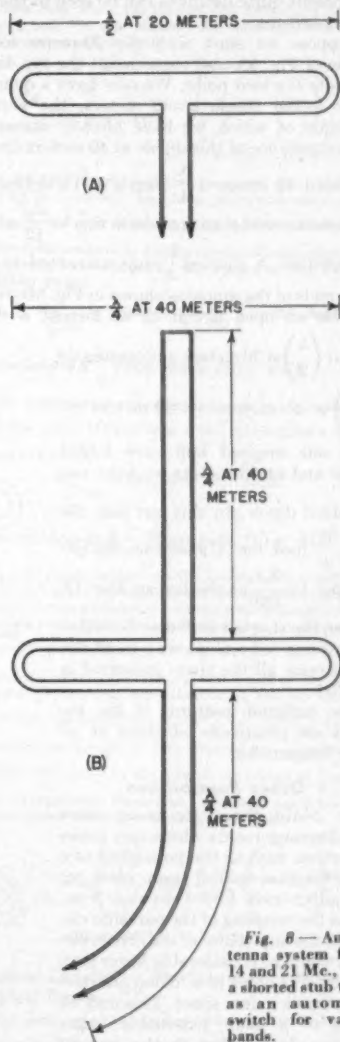


Fig. 8—An antenna system for 7, 14 and 21 Mc., using a shorted stub to act as an automatic switch for various bands.

ohms, a good match for coaxial cable. Suggested dimensions for 1850 kc. are given in the sketch.

### $\frac{3\lambda}{4}$ Folded Dipole

Now, since we have pretty well folded and loaded Fig. 1A, let us investigate the results of

folding Fig. 1C. This process and the resulting current distribution is shown in Fig. 7 where the center line represents a ground plane for the vertical analogue of the system. Calculation leads to an impedance for this three-quarter wave folded dipole of about 420 ohms. J. D. Kraus<sup>5,6</sup> (W8JK) has measured one of these to be about 450 ohms. The new 21-Mc. band makes this arrangement quite useful as can be seen in the following scheme:

Suppose we start with the 20-meter folded dipole of Fig. 8A and open-circuit the top dipole opposite the feed point. We now have a quarter-wave folded dipole at 40 meters, the vertical analogue of which we have already discussed. The impedance of this dipole at 40 meters should be about 12 ohms. A  $\frac{\lambda}{4}$  length of Twin-Lead at 40 meters would then transform this to  $\frac{Z_0^2}{12}$  at the transmitter. A shorted  $\frac{\lambda}{4}$  stub connected to the open ends of the dipole as shown in Fig. 8B would provide an open circuit at 40 meters, a short circuit  $\left(\frac{\lambda}{2}\right)$  at 20 meters, and open again

$\left(\frac{3\lambda}{4}\right)$  at 15 meters. At 20 meters we have our original half-wave folded dipole and at 15 meters we have our  $\frac{3\lambda}{4}$  folded dipole. In this last case the now  $\frac{3\lambda}{4}$  feed line transforms the impedance to  $\frac{Z_0^2}{420}$  at the transmitter. Of

course, the shorted stub may be folded up in some convenient way so as not to consume all the space indicated in Fig. 8B.

The radiation patterns of the antenna are practically identical at all three frequencies.

#### Other Possibilities

No doubt there are many more folded arrangements which may prove attractive, such as the possibility of a 40-meter close-spaced beam made up of quarter-wave folded dipoles. Now, due to the coupling of the parasitic elements, the impedance of the driven element would be considerably lower than the 10 to 12 ohms of a folded quarter-wave dipole in free space. This may be raised to a more reasonable value, however, by feeding at the current node (voltage feed) rather than at the current loop.<sup>2</sup> The driven element

would then look just like a 20-meter folded half-wave dipole, but the current distribution would be as shown in Fig. 9A and the entire array would look something like Fig. 9B. A T-match or a "Q"-section at the feed point may provide an even better driving-point impedance. The approximate over-all lengths of the elements, before folding, may be determined from the curves for 20-meter elements given in *The Radio Amateur's Handbook* or in the *ARRL Antenna Book*, simply by dividing the frequency scale in half and doubling the length scale.

With some compromise in element spacing this array may even be operated as a combination 40-20-15 beam by the use of small lumped networks in the parasitic elements in place of the rotationally cumbersome stubs of Fig. 8B. In case you would like to try this latter arrangement, Fig. 10A shows the impedance vs. frequency characteristic required and Fig. 10B shows a suitable network to accomplish this. The parameter  $K$  allows for variation in the over-all impedance level, but should be chosen so as to make  $C_1$  a conveniently small capacitor and include

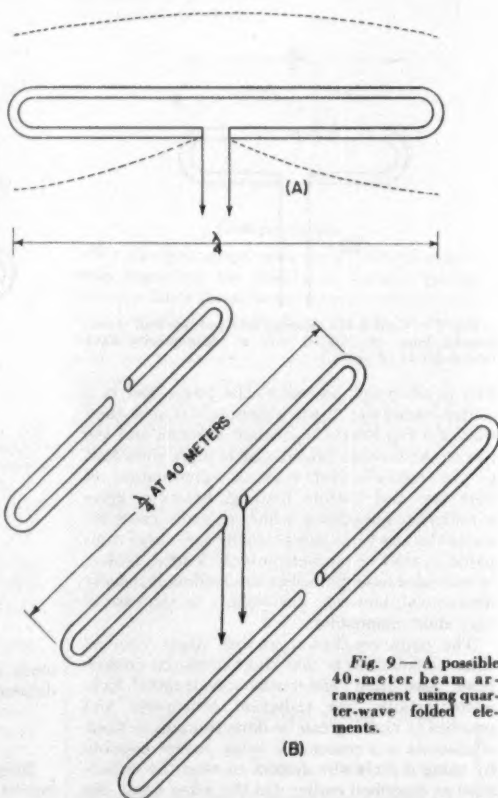


Fig. 9 — A possible 40-meter beam arrangement using quarter-wave folded elements.

<sup>5</sup> Kraus, *Antennas*, McGraw-Hill Book Co., Inc., New York, 1950; particularly Chapter 5 and par. 13 of Chapter 14.

<sup>6</sup> Kraus, "Multiwire Dipole Antennas," *Electronics*, 13, pp. 26-27, Jan., 1940.

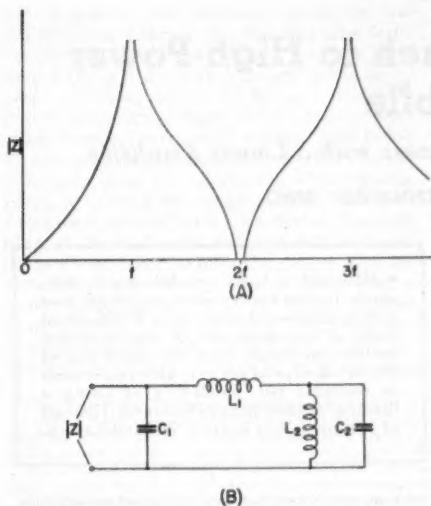


Fig. 10—Impedance variations in the frequency range of interest (A) and a lumped-circuit equivalent of the stub shown in Fig. 8. Component values can be calculated from the following formulas, where  $f$  is in megacycles:

$$\begin{aligned} C_1 &= K & \mu\text{fd.} \\ C_2 &= 2.4K & \mu\text{fd.} \\ L_1 &= \frac{4220}{Kf^2} & \mu\text{h.} \\ L_2 &= 1.67 L_1 & \mu\text{h.} \end{aligned}$$

The factor  $K$  may be chosen to make the inductances and capacitances come out to convenient or constructionally-feasible values.

the capacity between the two ends of the element. Since harmonic antennas are not, in general, exact multiples of length, all the network elements may require some adjustment after final assembly to approach resonance on all three bands.

### Appendix

#### $\frac{\lambda}{8}$ Folded Monopole (Fig. 4C)

To find the radiation impedance of the eighth-wave folded monopole we must find the far-field figure of proportionality normal to the axis of the antenna by subtracting the integrated current of the folded-over half from the integrated current of the unfolded half. The total length is  $\frac{\lambda}{4}$  or  $\frac{\pi}{4}$  radians so:

$$E_{\frac{\lambda}{8} \text{ Folded}} \propto \int_0^{\frac{\pi}{4}} \cos \theta d\theta - \int_{\frac{\pi}{4}}^{\frac{\pi}{2}} \cos \theta d\theta = \sin \theta \Big|_0^{\frac{\pi}{4}} - \sin \theta \Big|_{\frac{\pi}{4}}^{\frac{\pi}{2}} \quad (1)$$

$$= 0.707 - 0 - 1.00 + 0.707 = 0.414.$$

This is the far-field proportionality constant whose square must be compared with that of a known antenna to give the impedance. The known standard is, of course, the thin quarter-wave monopole whose figure is

$$E_{\frac{\lambda}{4}} \propto \int_0^{\frac{\pi}{2}} \cos \theta d\theta = \sin \theta \Big|_0^{\frac{\pi}{2}} = 1.0 - 0 = 1.0 \quad (2)$$

and whose theoretical input impedance is about 36 ohms.

Therefore, the approximate radiation impedance of the thin folded eighth-wave monopole is

$$R_{\frac{\lambda}{8} F} \approx 36(0.414)^2 = 6.2 \text{ ohms.} \quad (3)$$

#### Bottom-Loaded $\frac{\lambda}{8}$ Monopole (Fig. 4E)

The current distribution on a bottom-loaded eighth-wave monopole, Fig. 4E, is identical with the top half of the quarter-wave monopole which we folded over in the previous case, since the loading coil merely replaces the missing half. We can calculate the radiation resistance of the remaining half as follows:

$$E_{\frac{\lambda}{8} \text{ Bottom Loaded}} \propto \int_{\frac{\pi}{4}}^{\frac{\pi}{2}} \cos \theta d\theta = \sin \theta \Big|_{\frac{\pi}{4}}^{\frac{\pi}{2}} \quad (4)$$

$$= 1.00 - 0.707 = 0.293.$$

This far-field figure, however, concerns the impedance referred to a current maximum point and since we are feeding at the  $\frac{\pi}{4}$  or 45-degree point we must divide by the square of the cosine of 45 degrees (constant power impedance is inversely proportional to the square of the current). So finally we get

$$R_{\frac{\lambda}{8} \text{ BL}} \approx 36(0.293)^2 \left( \frac{1}{0.707} \right)^2 = 6.2 \text{ ohms.} \quad (5)$$

#### Top-Loaded $\frac{\lambda}{8}$ Monopole (Fig. 4F)

The approximate radiation resistance can be calculated from the cosine integral from 0 to  $\frac{\pi}{4}$  which gives a far-field factor of 0.707.

$$R_{\frac{\lambda}{8} \text{ TL}} \approx 36(0.707)^2 = 18 \text{ ohms.} \quad (6)$$

#### Center-Loaded $\frac{\lambda}{8}$ Monopole (Fig. 4G)

For the center-loaded case the calculation is a little more complicated, but our approximate method still applies. The far-field factor includes two additive components, the first of which comes from the bottom section of the antenna and is merely the cosine integral from 0 to  $\frac{\pi}{8}$ . The loading coil effectively replaces the missing center half of the antenna so that the current distribution along the top section is essentially the cosine curve from  $\frac{3\pi}{8}$  to  $\frac{\pi}{2}$ . Since the current is continuous through the coil, however, this second integral must be multiplied by the ratio of the cosines of  $\frac{\pi}{8}$  and  $\frac{3\pi}{8}$ . The approximate theoretical radiation resistance of a center-loaded eighth-wave monopole is then

$$R_{\frac{\lambda}{8} \text{ CL}} \approx 36 \left( \int_0^{\frac{\pi}{8}} \cos \theta d\theta + \frac{0.924}{0.383} \int_{\frac{3\pi}{8}}^{\frac{\pi}{2}} \cos \theta d\theta \right)^2 \quad (7)$$

$$= 36 (0.566)^2 = 11.5 \text{ ohms.}$$

#### Bottom-Loaded $\frac{\lambda}{16}$ Monopole or $\frac{\lambda}{4}$ Monopole Folded Twice

The cosine integral is broken down into four equal parts between 0 and  $\frac{\pi}{2}$  or 90 degrees. Two alternate parts are added and the other two are subtracted. The resulting impedance, which is the same as that of a bottom-loaded sixteenth-wavelength monopole, is

$$R_{\frac{\lambda}{16} F} \approx R_{\frac{\lambda}{16} \text{ BL}} \approx 1.2 \text{ ohms.} \quad (8)$$

(Continued on page 188)

# A Different Approach to High-Power Mobile

Power Economy and Compactness with a Linear Amplifier

BY J. EMMETT JENNINGS,\* W6EI

**A**FTER examining various mobile installations for 75-meter operation and feeling dissatisfied with existing equipment, we decided to build a new mobile transmitter. Before the design could be crystallized, it was necessary to examine existing modulation systems and methods of portable power generation. We established requirements which we felt should be met in our new design. They were:

- 1) The power for satisfactory communication should be in the range of a 200- to 250-watt carrier.
- 2) The size of the transmitter should be as small as possible.
- 3) The weight should be kept to a minimum.
- 4) The equipment should not require stabilized voltages.
- 5) Dynamotors and batteries should be avoided because of over-all efficiency and unsuitability for high power.
- 6) High-quality voice, considered a must, should be as good as the best fixed station. Dis-

\* 1098 East William St., San Jose 12, Calif.

• Although a ¼-kw. mobile rig is definitely in the luxury class, we think you will be interested to see how W6EI solved some of the problems of high-powered mobile operation. And the small size of the finished product may give you reason to consider the possibility of using a linear amplifier in your home rig, instead of the prevalent high-level modulation.

tortion, usually caused by overloaded modulators, should be kept low to prevent interference.

- 7) To clear bridges and overhead obstructions, the antenna would have to be limited to a height of 13 feet 6 inches above ground.

## Power Supplies

We had heard of using a d.c. generator driven from the fan belt, and also of using a gasoline-driven generator either under the hood or in the rear compartment. The Leccc-Neville alternator

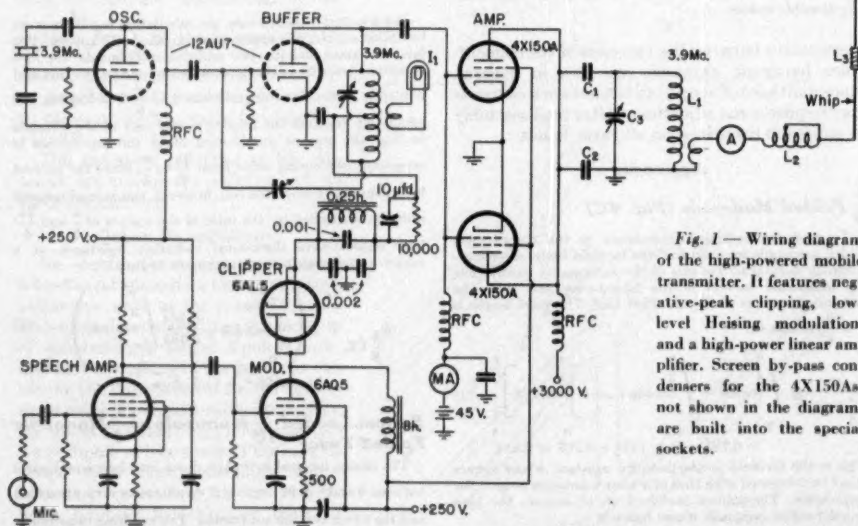


Fig. 1—Wiring diagram of the high-powered mobile transmitter. It features negative-peak clipping, low-level Heising modulation, and a high-power linear amplifier. Screen by-pass condensers for the 4X150As, not shown in the diagram, are built into the special sockets.

- C<sub>1</sub>—0.001-μfd. 5000-volt mica.  
 C<sub>2</sub>—250-μfd. 5000-volt vacuum (Jennings JCS-L-250).  
 C<sub>3</sub>—250-μfd. 5000-volt variable vacuum (Jennings UCS-L-250).  
 L<sub>1</sub>—18 turns ⅜-inch copper tubing, 2½-inch diameter, 4-turn link winding.

- L<sub>2</sub>—18-turn adjustable coil (with roller taken from surplus gear).  
 L<sub>3</sub>—Center loading coil.  
 A—6-ampere r.f. ammeter.  
 I<sub>1</sub>—2-volt 60-ma. flashlight bulb, modulation indicator and r.f. load.

was suggested, but frequency variation was thought to be a reason why the alternator could not work into a transformer load. However, tests were made in a car with a Leece-Neville three-phase generator connected to a double-delta step-up transformer bank. With a load on each phase of approximately 250 watts of light bulbs, we were surprised to learn that excellent regulation took place just above the idling speeds. Later, a three-phase bridge rectifier that produced 3000 volts at 220 ma. was tested. No input filter choke was necessary, and only a 2- $\mu$ fd. condenser was used to filter the output. The 250 volts d.c. for the exciter was obtained from a power supply connected to one phase. Another phase supplied the power for the high-voltage-rectifier filament transformers. The a.c. from the alternator could not be used to operate relays

because, while normal operation was obtained at low engine speeds, at higher speeds the higher frequency caused the relays to unlatch. However, 6-volt d.c. relays give satisfactory results.

The present power supply (not shown in the photographs) is smaller and lighter than the original. It measures only 12 inches long, 8 inches wide and 7 inches high, and weighs less than 40 pounds. This new power supply also delivers 3000 volts at 220 ma., as well as filling the low-voltage requirements, and it was made possible by a special design of 3-phase transformer.

### The Transmitter

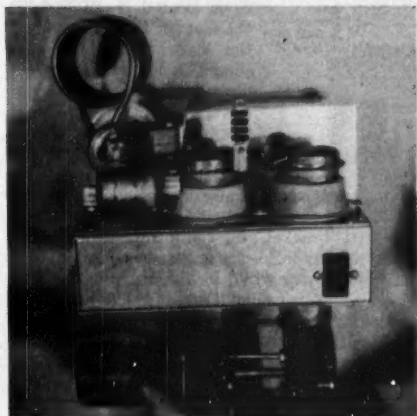
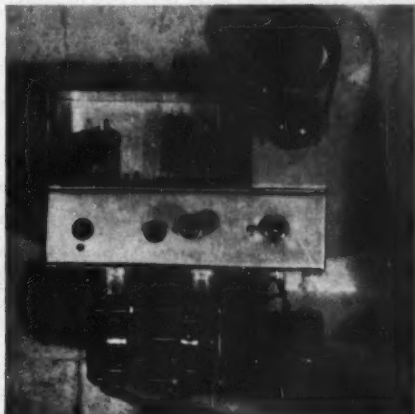
The transmitter departs from usual amateur practice, in that it uses a low-level modulation

(Continued on page 130)

This transmitter and power supply, tucked away in one corner of W6EI's station wagon, looks too small to put out a 250-watt carrier, but that's what it does. The secret lies in using low-level modulation followed by a linear amplifier, and compact tubes and condensers in the final. The linear is run at high voltage from a three-phase power supply, which cuts down the size of the power-supply filter components.

The transmitter proper is small enough to be held easily in one hand, but the use of 4X150As in the output stage requires the use of forced cooling, which accounts for the blower mounted under the rig.

One problem with high-powered mobile operation on 75 is the possibility of corona at the tip of the antenna whip, but this is solved by using a small wire cage at the tip of the whip.



# Improving the Series Noise Limiter

## Simple Circuit Changes for Better Performance

BY H. O. LORENZEN,\* W3BLC

SEVERAL years ago I became interested in putting a noise limiter in my BC-348. Friendly amateurs and engineers were only too happy to disclose their pet circuits, and each scheme was duly installed and evaluated. The results with all of them were pretty much the same, with one exception. In operation this particular circuit not only limits the noise peaks but seems to remove the remaining "stumps." After using it for a couple of years and recommending its use to all my friends, I felt ashamed at not having taken time to pass it along to the remainder of the amateur fraternity, so that anyone who wanted to might enjoy its use.

The circuit is shown in Fig. 1, and it can be seen that it closely resembles one of the series-limiter circuits carried in the *Handbook*. Actually, it differs only in the feed-back path of the cathode of  $V_1$  to the cathode of  $V_2$ , and this change calls only for one additional component. But it is this feed-back path that seems to do the trick of changing it from a conventional limiter to a *real* limiter. Several of my friends had expensive

• Any amateur plagued by automobile-ignition interference will welcome an improved noise-limiter circuit. Here W3BLC shows a simple modification of a widely-used series-limiter circuit that is well worth the slight effort involved. It should be particularly interesting to anyone operating mobile.

6H6 or 6AL5, or any other type that has cathodes brought out separately. Crystals were tried in the circuit but do not operate successfully. In the original circuit, as passed along to me,  $R_3$  was shown as a 50,000-ohm potentiometer, but after weeks of adjustment I decided there was little or no improvement with changes in the value, and a 6800-ohm fixed resistor was substituted. This value is not critical, and anything from six to nine thousand ohms works satisfactorily. The audio volume control should be one megohm or higher. It is obvious that considerable loss in

audio voltage is inherent with this circuit, but most receivers have twice as much as they normally need, so this is no serious drawback. To eliminate "tweets" at multiples of the intermediate frequency, it is advisable to shield the "hot" i.f. leads, keeping  $C_1$ ,  $R_1$  and  $R_4$  enclosed by a small metallic cover and the leads short. This is just good receiver-design practice. If the switch  $S_1$  is located remotely from the last i.f. transformer can, the leads to and from it should be shielded to cut down hum pick-up in the receiver. In my BC-348 I put this switch in one of the

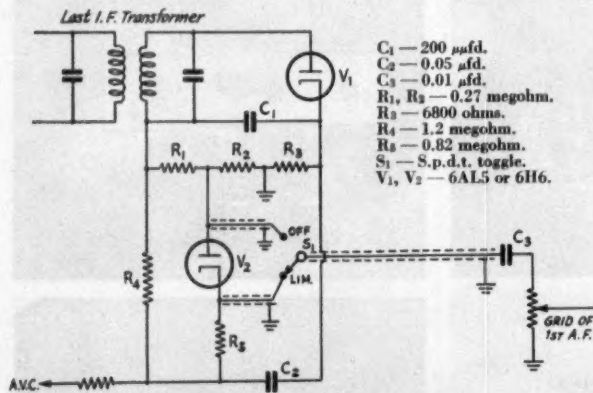


Fig. 1 — Circuit of the improved series limiter.

commercial receivers with conventional series limiters in them and, after changing over to this circuit, reported the receivers sounded like new sets. The boys operating on 10-meter 'phone will find this circuit excellent for eliminating ignition interference. One of my friends operating near the end of a bus line reported 99 per cent operating capability after installing the new limiter circuit. Previously, each QSO was interrupted by idling busses, while the drivers went out for their smokes.

The dual diode used in the circuit can be a

\*3713 Bangor Street, S. E., Washington 20, D. C.

'phone-jack holes, thus necessitating a long run around the chassis, but the hum pick-up from heater leads was completely eliminated by the shielding. I mounted the 6AL5 under the chassis on a little bracket near the terminals of the last i.f. transformer. For my money, the limiter could be permanently wired in the circuit. The only time I use  $S_1$  is to demonstrate the limiter.

For the record, this limiter, like all series limiters, does not show any appreciable improvement when operating on c.w. with a heavy b.f.o. signal swamping the second detector. However, when you use it on 'phone it's a "honey."

# Design Notes on a Specialized 'Phone Receiver

*Circuit Tricks for Improving Performance and Enjoyment*

BY ROBERT W. EHRLICH,\* W2NJR

• If a communications receiver means anything more to you than a box with a knob on the front, you will find a wealth of ideas in this article. It isn't intended for the amateur who has no idea how his receiver functions, but we guarantee that anyone else will read every word of it without stopping. W2NJR's trick for selectable-sideband reception without double conversion is particularly ingenious.

WHILE for years it has been customary for amateurs to buy their receivers rather than make them, it is becoming increasingly apparent that the modern commercial receiver, expensive as it is, falls short of furnishing the best in reception of amateur signals. When, as often as not, the owner of a brand-new receiver finds it necessary to augment its performance with a collection of adapters, selectors, preamplifiers and so on, a re-examination of the old custom appears to be indicated.

Most of the complexity and expense of the standard communications receivers is attributable to the features of broad coverage: bandswitching and gang tuning. These features require engineering compromises all along the line, and precision craftsmanship is needed to get even fair performance. Fortunately, the amateur who builds

his own receiver is in a unique position to by-pass all these problems by designing his receiver just to cover his favorite ham band, relying on crystal-controlled converters to pick up any other bands that may be wanted. In this way, the construction job can revert to the standard chassis-and-panel technique, leaving the builder free to concentrate on the circuit design features he wants to incorporate.

The amateur who builds his own receiver has several other advantages over the commercial designer. He can incorporate the exact combination of features to handle his particular needs. He can also avail himself of high-grade surplus components that would be out of the question commercially. And he can take advantage of the latest available techniques that usually take years to find their way into commercial products. As an example of this last item, the now familiar Q5-er was first described in *QST* in 1947,<sup>1</sup> yet it is only within the last year or so that receivers incorporating this degree of selectivity have appeared on the market. Meanwhile, still better selective systems have been devised.

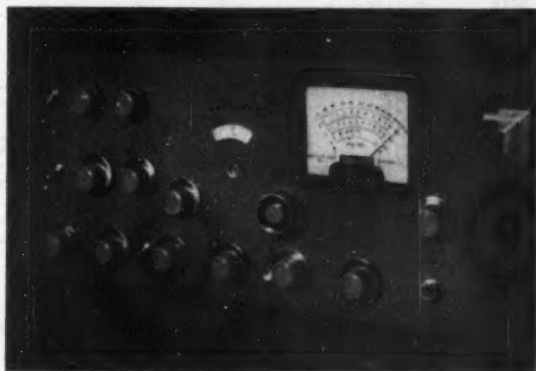
A receiver is described here that illustrates the principles just mentioned. No elaborate machine work was involved in making it, and its cost was moderate, yet for its specific job it will completely outperform anything on the market.<sup>2</sup> A detailed discussion of how to make this particular receiver would not be appropriate, because very few amateurs would want to copy it exactly, but it is hoped that a description of the significant features might offer some helpful ideas to the amateur who is seriously interested in getting the most out of his favorite band.

\* 21 Glen View Drive, West Orange, N. J.

<sup>1</sup> Rand, "The Q5-er," *QST*, December, 1947.

<sup>2</sup> This article was written before it was announced that the Collins 75A-3 includes extreme skirt selectivity for 'phone. See Roberts, "Mechanical Bandpass Filters," *QST*, February, 1953. — Ed.

Front view of the home-made receiver. Panel layout problems are minimized by the absence of bandswitching or gang tuning.



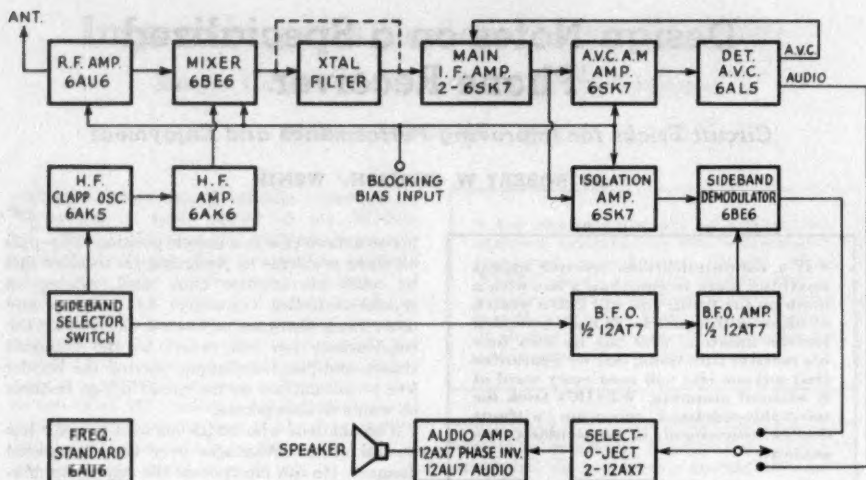


Fig. 1 — Block diagram of the homemade receiver.

### The Circuit

A block diagram of the receiver is shown in Fig. 1. The circuit was designed for 75–80 meters, with primary emphasis on the reception of single-sideband signals. Here, stability is the first requirement — the receiver should be exceptionally stable and capable of being tuned just a few cycles at a time. To take full advantage of s.s.b. communication, the selectivity should be high — high enough to accommodate just one sideband and reject strong adjacent-channel signals without intermodulation effects. Such other features as image ratio and noise limiting, which would be important in a 10-meter receiver, for example, seem to require only secondary consideration.

To start with the front end, its circuit is perfectly ordinary, but the mechanical arrangements for tuning are a departure from the usual

\* Mix, "Building a Series-Tuned VFO Unit," *QST*, December, 1948.

complex assembly of gears and shafts. The two r.f. circuits are gang-tuned with an ordinary two-section 50- $\mu$ fd. variable, with 100- $\mu$ fd. condensers added across each section to establish the right ratio of minimum to maximum capacitance for tuning the band.

The tuning circuits have slug-tuned coils, making it easy to set them to tune together. This condenser is brought out to a panel knob that works about like the old antenna trimmer; it is only necessary to peak up the front end occasionally.

The high-frequency oscillator was designed by pretending it was a transmitter VFO. Construction followed that of a high-stability Clapp VFO described in *QST*,<sup>8</sup> in which a separate box houses just the coil and condenser forming the tuned circuit. In this case, the tuning box was made by cutting down a surplus BC-458 transmitter chassis, which provided an excellent main tuning

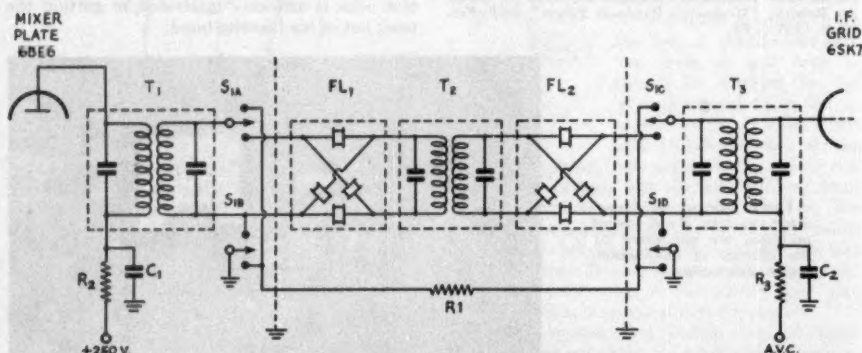


Fig. 2 — Crystal filter and switching circuit.

C<sub>1</sub> — 0.005  $\mu$ fd. ceramic.  
C<sub>2</sub> — 0.01  $\mu$ fd. ceramic.  
R<sub>1</sub> — 0.47 megohm.

R<sub>2</sub> — 1000 ohms.  
R<sub>3</sub> — 0.1 megohm.

FL<sub>1</sub>, FL<sub>2</sub> — Crystal-lattice filter section. See text.  
T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub> — 456-ke. iron-core interstage transformer.

condenser and a geared dial to go with it. In addition to the usual bandsetting fixed condensers, a 5- $\mu$ fd. variable was also added to provide a  $\pm 2$  kc. vernier adjustment on the front panel. This has proved to be very helpful in actual receiver operation.

Following the oscillator, an amplifier was found necessary to get enough drive for the 6BE6 mixer. This amplifier is fixed-tuned and peaked near the high-frequency end of the band, to compensate for the tendency of the Clapp oscillator to lose output at that end.

The crystal filter is, of course, the heart of the receiver's selectivity. The filter circuit is just as described by Weaver and Brown in *QST*,<sup>4</sup> using eight crystals of the 2-digit series. A switching circuit, shown in Fig. 2, enables the filter to be cut out when desired but still leaves two i.f. transformers in the circuit to retain moderate selectivity. The coupling resistor,  $R_1$ , is selected to make the over-all level of transmission through the i.f. system about the same whether the filter is in or out. The switching circuit and its shielding

had to be designed to contribute no stray capacitance paths around the filter when it is being used.

It is significant that the filter is the first thing in the i.f. system. This follows the principle used in producing high adjacent-channel selectivity in commercial mobile receivers, the idea being to eliminate all unwanted signals at the lowest possible power level before they are amplified. There was some apprehension that the attenuation of the filter might degrade the over-all signal-to-noise ratio, but it was found that the front end had enough gain so that the first r.f. grid circuit still is the controlling noise source.

After two stages of amplification, the i.f. system splits into two branches. One branch feeds a carrier-type demodulator, using a 6BE6 tube, for detection of c.w. and s.s.b. signals. With this kind of detector, shown in the upper portion of Fig. 3, no intermodulation products are developed as long as the signal input is held below about one volt. The i.f. stage feeding this detector does not provide any additional gain; its main function is to isolate the main i.f. and a.v.c. systems from the effects of the strong b.f.o. signal (about 20 volts) injected into the 6BE6.

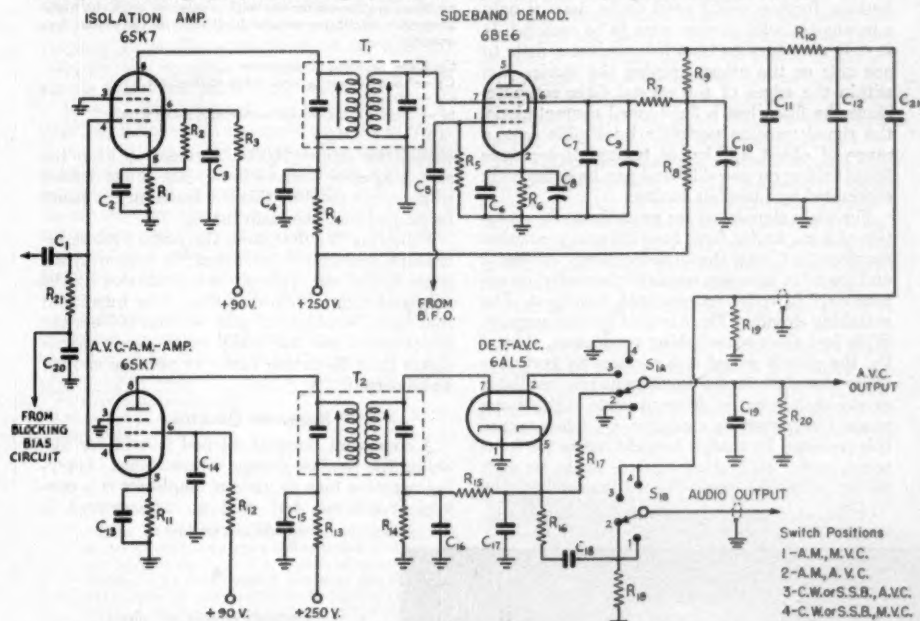


Fig. 3—The i.f. branch amplifiers, detectors, a.v.c. and switching circuits.

- $C_1$  — 100  $\mu$ fd.  
 $C_2, C_3, C_4, C_6, C_7, C_{12}, C_{14}, C_{15}, C_{18}, C_{20}, C_{21}$  — 0.01- $\mu$ fd. ceramic.  
 $C_5, C_{11}$  — 470  $\mu$ fd.  
 $C_8$  — 10- $\mu$ fd. 50-volt electrolytic.  
 $C_9, C_{10}$  — 8- $\mu$ fd. 450-volt electrolytic.  
 $C_{13}, C_{16}, C_{17}$  — 270  $\mu$ fd.  
 $C_{19}$  — 1  $\mu$ fd., oil-filled.  
 $R_1, R_5$  — 20,000 ohms.  
 $R_2, R_{10}, R_{15}$  — 47,000 ohms.  
 $R_3, R_4, R_{12}, R_{13}$  — 1000 ohms.

- $R_6, R_{11}$  — 220 ohms.  
 $R_7$  — 10,000 ohms, 1 watt.  
 $R_8$  — 2700 ohms.  
 $R_9$  — 33,000 ohms.  
 $R_{14}$  — 0.1 megohm.  
 $R_{16}, R_{20}$  — 10 megohms.  
 $R_{17}$  — 2.2 megohms.  
 $R_{18}, R_{19}$  — 1 megohm.  
 $R_{21}$  — 0.47 megohm.  
 $S_1$  — 2-circuit 4-position wafers switch.  
 $T_1$  — 456-kc. iron-core interstage transformer.  
 $T_2$  — 456-kc. iron-core output transformer.

The second branch feeds a combination a.m. detector and a.v.c. system, using a 6AL5 double diode. This circuit, together with the switching arrangement for the two detectors, is shown in the lower part of Fig. 3. Of particular interest is the diode section that is cut in series with the a.v.c. line on switch position No. 3, for a.v.c. reception of c.w. or s.s.b. signals. This diode causes the a.v.c. to charge up quickly but discharge slowly, so that in effect the a.v.c. bias "hangs up" and rides with the peaks of the received c.w. or s.s.b. signal. Discharge time is about 2 seconds.

The i.f. stage feeding the a.v.c. detector operates at a fixed gain of about 40. With this arrangement, there can be 40 volts of a.v.c. bias for every 1 volt of signal at the 6BE6 demodulator grid. Since 40 volts is enough to cut off the main i.f. amplifiers, it follows that, with the a.v.c. operating, no signal can possibly overload the 6BE6 demodulator.

Coming to the matter of sideband selection, nothing further would need to be done if only a.m. signals, with carrier, were to be received. It is only necessary to tune the receiver a little to one side or the other, keeping the carrier just within the edges of the crystal filter response. Since the filter has a flat-topped characteristic, the signal remains perfectly intelligible over a range of about  $2\frac{1}{2}$  kc. of tuning. Heterodyne QRM falling on one sideband can be completely eliminated by judicious tuning.

For s.s.b. signals, or for exalted-carrier reception of a.m., tuning from one sideband to another requires that both the high-frequency oscillator and the b.f.o. injection oscillator be moved simultaneously in order to maintain zero beat. The switching circuit of Fig. 4 is used for this purpose. With just the two switching condensers,  $C_1$  and  $C_2$ , the circuit would not perform properly because the shift in the high-frequency oscillator would be different at different parts of its tuning range. Compensating capacitor,  $C_3$ , takes care of this problem. Its shaft is brought out to the front panel, and a calibration mark is made for each 100 kc. across the band. The setting need only be

<sup>8</sup> Villard and Weaver, "The Select-o-ject," *QST*, November, 1949.

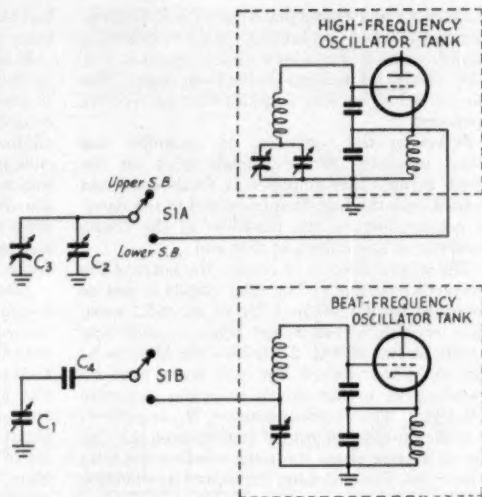


Fig. 4—The sideband-switching circuit. The connections are shown for use with a receiver with the high-frequency oscillator on the high side of the signal frequency.

$C_1, C_2$  — 7-45  $\mu$ fd. trimmer.  
 $C_3$  — 15- $\mu$ fd. midjet variable with shaft.  
 $C_4$  — 10  $\mu$ fd.  
 $S_1$  — 2-circuit 2-position ceramic wafer switch.

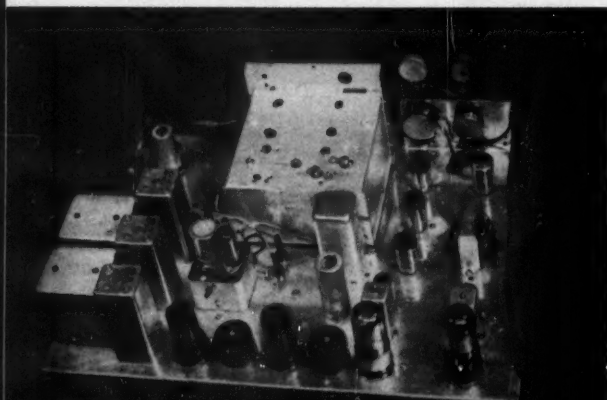
within the proper 100-kc. segment to keep the switching error within a few cycles. If one desired to go to the trouble, this condenser might easily be ganged with the main tuning.

Following the detectors, the audio system includes a standard Select-o-ject<sup>8</sup> to help with the heterodynes, etc., that are not eliminated by the sideband filter. Following this, it is important that there be plenty of gain, so that neither the Select-o-ject nor the 6BE6 stage need operate above their distortion limits to produce enough audio output.

#### Receiver Quieting

A somewhat unusual method is used for disabling the receiver during transmissions. Applying negative bias to various amplifiers is a convenient scheme, but such an arrangement is

(Continued on page 128)



Ordinary chassis and panel construction can be used. The large box at the center houses the coil and tuning condenser for the high-frequency oscillator. The crystal-filter network elements are mounted in the group of shield cans at the left.

# A Sweep-Tube C.W. Rig for 3.5 and 7 Mc.

## Low-Power Transmitter Complete with Power Supply and Antenna Coupler

BY C. VERNON CHAMBERS,\* WJEC

•Although this rig is suitable for the Novice making his start on 3.5 and 7 Mc., it is also one of those jobs that should be popular with every type of licensee. Therefore, if you have need for a small package that can be put on the air in jig time, don't pass up this description just because the Novice has been mentioned.

**T**HIS complete crystal-controlled 15-watt transmitter has features which should appeal to every type of amateur. It has a commercial appearance that was obtained without any difficult constructional tricks and it employs simple circuits that discriminate against inadvertent out-of-the-band operation. The layout employs an oscillator-amplifier r.f. section and includes the antenna coupler and the power supply as integral parts of the assembly.

As we have indicated, the transmitter is so practical because of its completeness as to make it useful for many applications. For instance, it is ideal for emergency work requiring a rig that can be installed quickly and easily. It will take up less than one third of a cubic foot of car trunk space when you're packing up for that next vacation, and it is small enough to keep around the shack as a spare until such time as failure, re-vamping or de-TVling disables the big rig for an extended period. There is also the possibility of adding an auxiliary power plug to the unit so that it may be used for field day or mobile operation. The output—approximately 10 watts

\* Technical Assistant, QST.

† Chambers, "A 30-Watt Transmitter for 50 Mc.," QST, August, 1952.

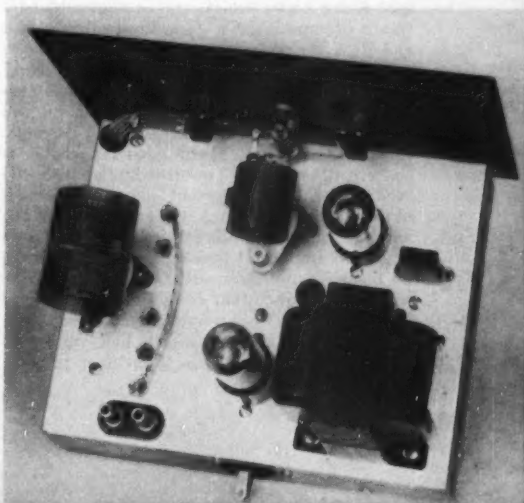
This interior view of the low-power transmitter shows the antenna coil centered at the left edge of the 2 × 7 × 9-inch aluminum chassis. Five feed-through bushings for the antenna circuit are located to the right of the coil and the feeder terminals are at the rear of the base.  $L_2$ , the oscillator tube, and the crystal are at the front right-hand section of the chassis and the 5Y3GT is on the center line just to the left of the power transformer. A  $\frac{7}{16}$ -inch hole, equipped with a rubber grommet, to the front of  $T_1$ , provides through-chassis clearance for a neutralizing tool. The a.c. input connector is located on the rear wall of the chassis.

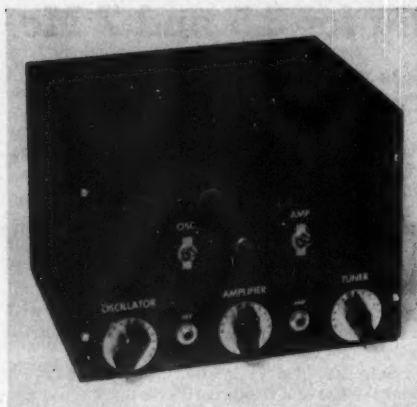
—is not only enough to provide many an enjoyable contact but also will drive a sizable amplifier. The power-supply components used in the transmitter are of the inexpensive b.c. replacement type and may therefore be used with converter, VFO, etc., circuits if and when the r.f. section has outlived its usefulness.

Selection of a Type 6BL7GT as the r.f. tube and the use of a triode oscillator-neutralized amplifier combination in simplicity all along the line. The 6BL7 is a rugged TV-type twin triode that had already proven itself at frequencies as high as 50 Mc.<sup>†</sup> and the triode circuits usually call for less parts and handle more easily than their pentode or tetrode counterparts. Old-timers may shudder a little at the thought of going back to a triode oscillator, but the circuit can be made to do a job without blowing the crystal right out of the holder and it delivers practically no output at harmonic frequencies. This last feature is of particular interest to anyone who has gone through the battle against TVI. As for the triode final, it also features simplicity inasmuch as there is no screen circuit to worry about, and it is easily stabilized, once and for all, by a simple neutralizing adjustment. In addition, the tuning range of the amplifier plate circuit prevents inadvertent doubling in the output stage. In other words, you will not accidentally end up one band higher than intended as long as the tank coil has been properly selected.

The appearance of the transmitter is made appealing by housing the chassis in a metal cabinet and by marking the panel with decals. Constructional chores are reduced to a minimum by circuitry already mentioned and by mounting

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all components on a compact but not overcrowded chassis. Having the r.f., power and output coupling circuits arranged as a single assembly eliminates the need for cables and individual enclosures and greatly increases the portability of the transmitter. The cost of the rig—including cabinet, tubes, two crystals and two sets of commercial coils—is about \$47.

### The Circuits

As shown by Fig. 1, the crystal oscillator utilizes one section of the 6BL7.  $J_1$  of this circuit is the keying jack for the complete transmitter and also serves as the oscillator metering jack during tune-up time. The plate tank,  $C_2L_1$ , is a 2-band affair that works with both crystals. The frequency range (3.75 to 9.2 Mc.) of the tank has been adjusted so that by observing a simple precaution it is possible to obtain adequate drive for the amplifier without endangering the crystal. (More about this later on.)

Plate voltage for the oscillator is held to a safe value (approximately 200 volts) by a series-dropping resistor,  $R_2$ , and output from the stage is capacity-coupled to the final through  $C_6$ . Although the oscillator has a 2-band plate circuit, the circuit is never used as a frequency doubler.

The amplifier employs grid-leak bias, has a split-stator plate circuit, and is neutralized by means of capacitor  $C_7$ .  $J_2$  is the metering jack and  $S_1$  is the plate-voltage on-off switch. With excitation available and with  $S_1$  open, a meter plugged into  $J_2$  will register amplifier grid current. When the switch is closed, the meter will indicate the combined plate and grid currents.  $J_2$  is insulated from ground (so far as d.c. is concerned) except for a return through  $J_1$  of the oscillator. This arrangement allows both stages of the transmitter to be keyed at  $J_1$ . Because the amplifier jack is insulated from ground, it is extremely important that capacitors  $C_{10}$  and  $C_{11}$  be included in the circuit. Otherwise, there is sufficient r.f. radiation from the plug-in-meter leads to cause TVI in a weak-signal area.

Output from the amplifier is link-coupled to the antenna tuner,  $C_{13}L_4$ . The tuner uses an

The two-band transmitter is housed in a hinged cover metal cabinet. The knobs across the bottom of the 7 × 10-inch panel, from left to right, control the oscillator, amplifier and the antenna coupler.  $S_1$  is located directly above  $J_1$  and to the left of the panel indicator.  $S_2$  is mounted above the amplifier metering jack,  $J_2$ .

inductor that is physically larger than that of the amplifier only because of the desirability of employing variable coupling at one end of the circuit. Unfortunately, the MCL series of coils does not include a swinging-link model and they are not easily modified to include this feature. The tuner components have been wired to feed-through bushings and the antenna feeder terminals in a manner which permits adjustment of the LC ratio for either series or parallel tuning. An accompanying chart lists the jumper connections which should be used for setting up the tuner circuit.

The power supply employs a condenser-input filter and delivers approximately 330 volts when loaded by the transmitter.  $S_2$  is the on-off switch for the supply and the a.c. input must be controlled by the power switch for the station. Incidentally, if the supply is used for some other purpose at a later date, and if the new application calls for less voltage, the output under full load can be reduced to approximately 260 volts by removing the input filter capacitor,  $C_{14}$ .

### Construction

Three photographs of the transmitter show how the components are laid out on the chassis and the panel. The jacks, switches, and the panel indicator are the only parts actually mounted on the panel of the Bud type C-993 cabinet. Tuning capacitors for the oscillator and the amplifier are mounted on the front wall of the chassis and  $C_{13}$  of the coupler is mounted on small pillars at the right side (rear view) of the base.  $C_{13}$  must be insulated from ground and this is taken care of by the physical construction of the Bud type LC-1663 capacitor and by employing an insulated shaft coupling between the capacitor and a panel bearing assembly that is in turn mounted on the front wall of the chassis. A space must be left between the chassis and the panel to accommodate the flange of the bearing assembly and this is provided by using  $\frac{1}{4}$ -inch metal pillars between panel and base at either end of the unit. Three-eighths-inch holes are drilled in the panel for the tuning shafts of the three capacitors, and  $1\frac{1}{2}$ -inch openings are punched in the front wall of the chassis to provide clearance for the panel-mounted jacks.

The rear view of the transmitter shows the coil sockets mounted on  $\frac{1}{2}$ -inch metal pillars. The socket for  $L_2$  should be oriented with prong No. 3 facing toward the 6BL7 and the socket for  $L_4$  should have prong No. 3 pointing in the opposite direction. This allows a short length of 75-ohm

Twin-Lead to be connected most directly between the coupling links of the two circuits. Wiring and layout of small components will be further simplified if the key of the 6BL7 socket faces the rear of the chassis and if the heater pins of the 5Y3GT face the panel.

The bottom view of the transmitter identifies the components which require somewhat special placement. No. 16 tinned is used for the r.f. wiring, and Belden shielded wire No. 8885 is used for the leads running to the switches and the pilot lamp. The strip of flashing copper that supports  $C_7$  is  $\frac{1}{2}$ -inch wide at one end and tapers down to  $\frac{1}{8}$  inch at the tube socket end.  $C_7$  is mounted in a  $\frac{1}{4}$ -inch hole, drilled at the wide end of the strip for that purpose.

The oscillator plate dropping resistor,  $R_2$ , must normally dissipate slightly over 2 watts. Inasmuch as a 5- or 10-watt unit was not on hand at the time of construction, the required resistance and dissipation ratings were obtained by connecting three 33,000-ohm 1-watt resistors in

parallel. The three jumpers for the antenna circuit are 2,  $3\frac{1}{2}$  and  $4\frac{1}{2}$  inches long, respectively, and are made with ordinary hook-up wire and Millen type 36021 grid connectors. The holes in the connectors must be enlarged by reaming so that they will fit over the National type TPB bushings that serve as Terminals 1 through 5 of Fig. 1. Small battery or Fahnestock clips may be used with the jumpers if the Millen connectors are not readily obtainable.

### Testing

A 15-watt lamp bulb equipped with short wire leads, a 0-100-ma. meter, a key and a voltmeter should be available for testing the transmitter. The first test is made with the key (make sure the contacts are open) plugged into  $J_1$ , with  $S_1$  set at the open position and with the voltmeter connected across  $R_4$ . Under these conditions, and with 115 volts a.c. applied to  $T_1$ , the supply output should exceed 400 volts when  $S_2$  is closed.

Next, turn off the supply and insert a 3.5-Mc.

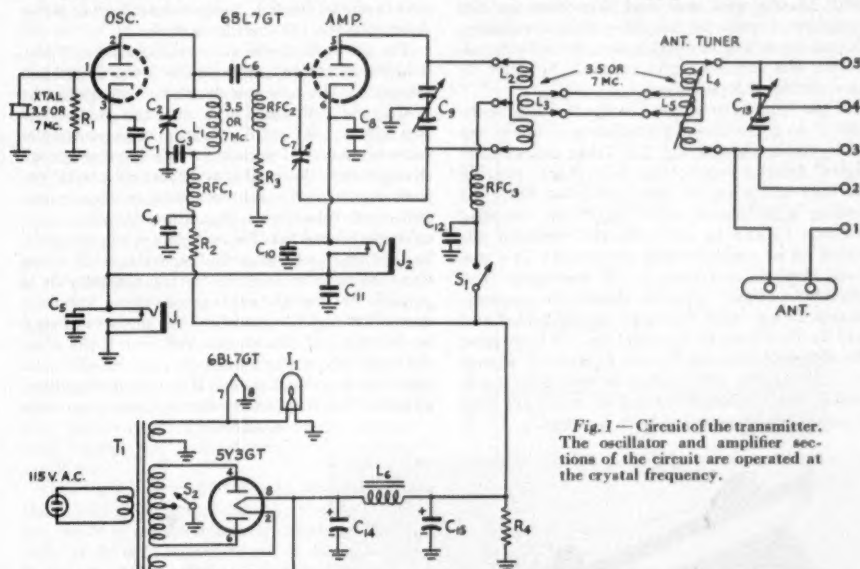


Fig. 1—Circuit of the transmitter. The oscillator and amplifier sections of the circuit are operated at the crystal frequency.

- $C_1, C_3, C_4, C_8, C_{12}$  — 0.005- $\mu$ fd. disk ceramic.
- $C_2$  — 140- $\mu$ fd. variable (Hammarlund HF-140).
- $C_5, C_{10}, C_{11}$  — 0.001- $\mu$ fd. disk ceramic.
- $C_6$  — 15- $\mu$ fd. mica or ceramic.
- $C_7$  — 1-8- $\mu$ fd. tubular trimmer (Eric 532-10).
- $C_9, C_{13}$  — 100- $\mu$ fd. per-section variable (Bud LC-1663).
- $C_{14}, C_{18}$  — 8- $\mu$ fd. 450-volt electrolytic (Sprague TVA-1704).
- $R_1$  — 68,000 ohms,  $\frac{1}{2}$  watt.
- $R_2$  — 10,000 or 11,000 ohms; see text.
- $R_3$  — 10,000 ohms,  $\frac{1}{2}$  watt.
- $R_4$  — 50,000 ohms, 10 watts.
- $L_1$  — 33 turns No. 24,  $\frac{1}{4}$ -inch diam.,  $1\frac{1}{2}$  inches long (B & W Miniductor No. 3012).
- $L_2$  — 3.5 Mc. — 40  $\mu$ h. — 46 turns No. 24,  $1\frac{1}{4}$ -inch diam.,  $1\frac{1}{2}$  inches long, center-tapped (B & W 80MCL).
- 7 Mc. — 14  $\mu$ h. — 26 turns No. 22,  $1\frac{1}{4}$ -inch diam.,  $1\frac{1}{2}$  inches long, center-tapped (B & W 40MCL).

- $L_3$  — 3.5 and 7 Mc. — Each 3 turns No. 18, wound with turns spaced wire diam., over center of  $L_2$ .
- $L_4$  — 3.5 Mc. — 37  $\mu$ h. — 38 turns No. 16,  $1\frac{1}{2}$ -inch diam.,  $2\frac{1}{4}$  inches long. Wound in 2 sections with  $\frac{3}{16}$ -inch space at center for  $L_3$  (B & W 80JVL).
- 7 Mc. — 12.8  $\mu$ h. — 22 turns No. 16,  $1\frac{1}{4}$ -inch diam.,  $2\frac{1}{4}$  inches long. 2 sections with  $\frac{3}{16}$ -inch space at center for  $L_3$  (B & W 40JVL).
- $L_5$  — 3.5 and 7 Mc. — Each 3 turns No. 16,  $1\frac{1}{4}$ -inch diam., turns spaced wire diam.
- $L_6$  — 8-henry 75-ma. filter choke (Stancor C1355).
- $I_1$  — 6.3-volt panel-indicator assembly.
- $J_1, J_2$  — Closed-circuit jacks.
- $RFC_1, RFC_2$  — 1-mh. r.f. choke (National R-50).
- $RFC_3$  — 2.5-mh. r.f. choke (National R-100S).
- $S_1, S_2$  — S.p.s.t. toggle switch.
- $T_1$  — Power transformer: 340 volts r.m.s. each side of center tap, 70 ma.; 5 volts, 2 amp.; 6.3 volts, 2.5 amp. (Stancor PC8408).

crystal in the holder and a 3.5-Mc. coil in the amplifier. The meter should be plugged into  $J_2$  and  $S_1$  must be open for the time being. Now, turn on the power, close the key and tune the oscillator plate capacitor,  $C_2$ , for an amplifier grid current of approximately 10 ma. If the crystal kicks out as the maximum capacitance of  $C_2$  is reached, the plate tank is tuned too close to the crystal frequency and it is necessary to retune to the high frequency side of resonance. With the original circuit, we pruned  $L_1$  until the low-frequency limit of the circuit was approximately 3.75 Mc. with the result that it is impossible to knock any of our pet 3.5- to 3.6-Mc. crystals out of oscillation by improper tuning of the plate tank. In any event, make certain that the oscillator is not tuned for maximum output inasmuch as this type of adjustment results in excessive crystal current. If the meter is transferred to  $J_1$ , it should show a cathode current of 30 ma.

The next step is that of neutralizing the amplifier. Start with  $C_7$  set for minimum capacitance (slug all the way out) and then increase the capacitance until the amplifier plate condenser,  $C_9$ , can be swung through resonance without affecting the amplifier grid current.  $S_1$  must be open during this adjustment.

If the lamp is to be used as the test load, connect it to the antenna terminals and insert the 7-Mc. coil in the coupler. The 7-Mc. coil and the high- $C$  jumper connections (see chart) provide the best match for the bulb at 3.5 Mc. Start the loading adjustments with very loose coupling between  $L_4$  and  $L_5$  and with the oscillator adjusted for an amplifier grid current of 5 or 6 ma. Now, close  $S_1$  and tune  $C_9$  for resonance. The amplifier cathode current should be approximately 25 ma. with the stage lightly loaded and may be increased to 55 or 60 ma. by increasing the coupling between  $L_4$  and  $L_5$  and by adjustment of  $C_{13}$ . As the loading is increased, make certain that the amplifier and the tuner are kept at resonance by retuning both  $C_9$  and  $C_{13}$ .

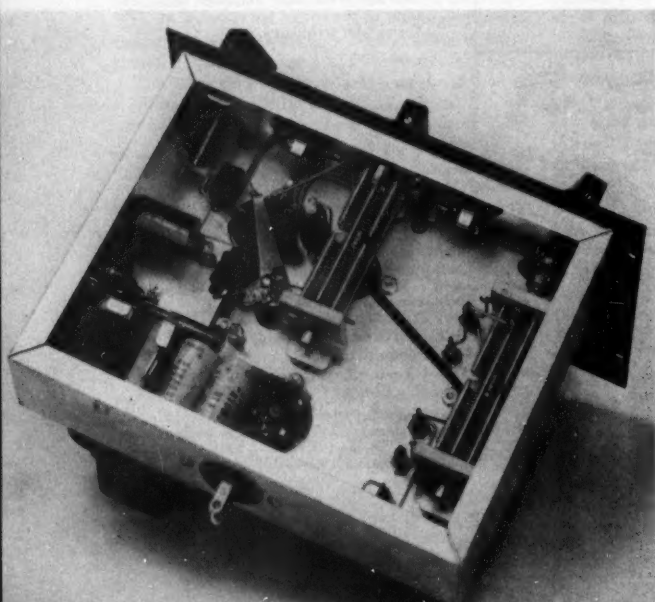
**Antenna-Coupler Connection Chart**

Tuning	Jumper Connections		
	Low- $C$	Med.- $C$	High- $C$
Parallel	1-5 2-3	1-5 3-4	1-5 2-5 3-4
Series	1-2	1-4	1-4 2-5

With the amplifier fully loaded, the power supply output voltage will drop to approximately 325 volts and, as a result, the cathode current for the oscillator section of the 6BL7 will be lower than that recorded earlier. About 15 ma. is correct for the oscillator and this current may be checked by inserting the meter plug into  $J_1$ . Of course, with the amplifier in operation, it is necessary to subtract the amplifier cathode current from the reading registered at  $J_1$  in order to determine the true oscillator drain.

The set-up for testing the transmitter at 7 Mc. is identical to that used at the lower frequency except for the antenna coupler connections. At 7 Mc., the bulb loads best with the coupler circuit adjusted for low- $C$  operation. One precaution must be observed with the 7-Mc. crystal in use. Always start the oscillator adjustment with the tank capacitor,  $C_2$ , set for minimum capacitance and then tune for a maximum amplifier grid current of 5 or 6 ma. There is always a temptation to continue increasing the capacitance of  $C_2$  as this results in more drive for the amplifier (it is possible to drive the grid current up to 10 ma. or more) but please remember that the crystal may be damaged by this abuse. And even if the crystal does stay in the holder, you can be very certain that it won't key well if the circuit has been adjusted for maximum output. Just keep that

(Continued on page 138)



Bottom view showing  $L_1$  and RFCs mounted on tie-point strips to the left and the rear of the 6BL7 tube socket, respectively. RFC<sub>1</sub> is parallel with the left wall of the chassis and RFC<sub>2</sub> stands up to the left of  $C_9$ .  $R_2$  and  $R_4$  are in front of  $L_5$  and the filter capacitors at the rear of the chassis. The neutralizing capacitor,  $C_7$ , is supported by the rear stator terminal of  $C_9$  and by a strip of flashing copper which also serves as the capacitor-to-grid lead. Holes,  $1\frac{1}{4}$  inches in diameter, punched in the chassis just below the centers of  $C_9$  and  $C_{13}$ , provide clearance for the coil-socket wiring.

**QST for**

# • Technical Topics —

## Diode Modulators

UNTIL the current interest in single-sideband transmitting techniques, amateurs had little or no contact with diodes used as modulators. While it is true that we have been using them for years as demodulators — “detectors” is the common word — there was never any reason to consider their use in the allied function of modulator. Their use as modulators is old hat to the commercials, however, particularly in the field of carrier telephony, and if you work for the telephone company you have probably run into them hundreds of times.

But before we get into a discussion of diodes, let's review some of our basic concepts and terminology, because it will help us to understand a few things later on. You are all familiar with the plot of an alternating current or voltage with respect to time. This is shown in Fig. 1A, where the time is represented along the horizontal axis and the amplitude is shown on the vertical. An alternating current or voltage of a single frequency is called a “sine” (or “cosine”) wave, from the trigonometric function that defines the instantaneous values. It is symmetrical about the zero-amplitude axis, the positive peaks extending as far above as the negative peaks do below. Along the time axis, the distance between similar parts of the wave is a time equal to  $1/f$ , where  $f$  is the frequency. If the wave in Fig. 1A is to represent a 1000-cycle wave,  $1/f$  is 0.001 second, but if it were a 100-kc. wave,  $1/f$  is 0.00001 second. Drawn to the same scale, the 1000-cycle and 100-kc. waves might look as in Fig. 1B. But remember that the *shape* is always the same, and that only the scale changes. It's something like those trick mirrors in a penny arcade — they change the scale in one or the other dimension.

One very important thing to remember from the preceding paragraph is that a single-frequency a.c. wave is always symmetrical about the zero axis. If it isn't symmetrical, it isn't a single-frequency affair. Take, for example, the job shown in Fig. 1C. At first glance it looks exactly the same as that in Fig. 1A, with the zero-amplitude axis displaced. (That's just what it is.) But it no longer represents a pure a.c. wave, because it doesn't satisfy our definition of being symmetrical about the zero-amplitude axis. Instead, it is now a representation of the a.c. wave of Fig. 1A plus a d.c. (zero-frequency) component. It is obtained by adding the a.c. wave to a steady d.c. value, as shown. The polarity never goes negative, in contrast to the pure a.c. wave where the polarity is negative half the time. (Of course, the d.c. component could be negative, in which case the polarity would never go positive; or the d.c. component could be less than the peak value of the a.c., in which case the wave

would fall on both sides of the zero-amplitude axis, but not symmetrically.)

This a.c. wave with a d.c. component is easy to come by, and exists in many places throughout radio equipment. The current in an audio amplifier is of this type, where the d.c. component is the steady value of plate current and the a.c. component is the audio signal. But there is one more thing we should know — and remember — about it. If the d.c.-plus-a.c. signal is coupled to anything, like a load or another stage, through a condenser or a transformer, only the a.c. component appears at the load. This should be obvious, of course — the condenser or transformer cannot pass the d.c., and anything passing through the condenser or transformer must swing equally about the zero-amplitude axis. Thus the signal of Fig. 1C passing through a condenser or

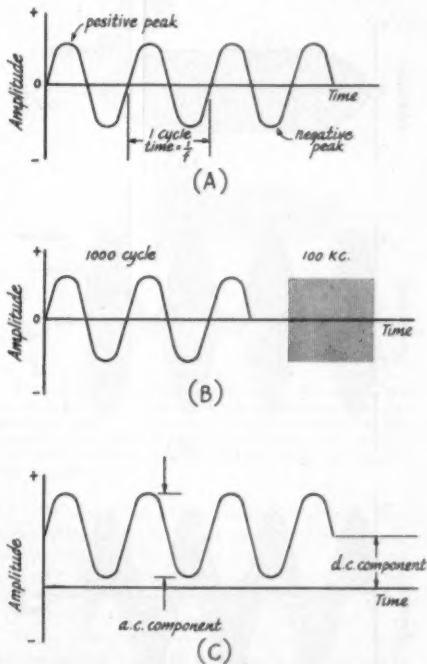


Fig. 1 — The old sine wave, familiar to one and all, is shown at (A). It is a plot of amplitude vs. time of a single-frequency a.c. wave.

Two different frequencies drawn to the same time-base scale look entirely different, because the higher-frequency cycles are necessarily crowded (B). The shape is the same, however — only the scale is different.

A pure single-frequency a.c. wave must swing equally above and below the axis — if it doesn't, it has a “d.c. component” (C).

transformer — or “a.c. coupler” — will appear as Fig. 1A.

### Envelopes

Before we settle down to the main business at hand, there is one more aspect of a.c. that we should review. The signals in Fig. 1 were drawn for only a few cycles, for convenience and ease of studying, but we should worry a little about how they start and stop. Suppose we examine a 100-kc. signal that builds up slowly (instead of instantaneously as in Fig. 1B) and then decays slowly. It might look as in Fig. 2A. The first few (and the last few) cycles do not have the same peak-to-peak amplitude that the main bulk of the cycles do. The outline of the 100-kc. wave is represented by the dashed line and is called the “envelope.” Notice particularly that this dashed line (envelope) does not represent the instantaneous value of the wave, but only the limits of its peak-to-peak excursions. It is, however, symmetrical about the axis, and must always be so if no d.c. component is present.

Fig. 2B should be a familiar picture. It represents this 100-kc. signal we have been using

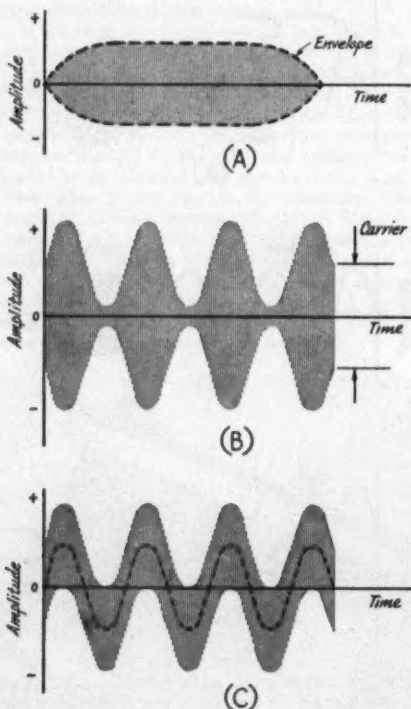


Fig. 2 — High-frequency waves don't start and stop instantaneously, and the outline of their rise and fall is called the "envelope" (A). Each cycle swings equally above and below the axis, however.

The familiar envelope of a "modulated" wave is shown at (B), with the less-familiar pattern of "superimposed" waves at (C).

"modulated" by our 1000-cycle signal. Actually, the only a.c. signal drawn here is the 100-kc. "carrier," although we immediately recognize that the envelope has the form of our 1000-cycle signal. The amplitudes of the 100-kc. cycles are changing from time to time. Notice also that, looking at the half r.f. cycles above the zero-amplitude axis, the outline bears a strong resemblance to Fig. 1C, except that in Fig. 2B the envelope replaces the signal, and the (half) carrier amplitude replaces the d.c. component. The same picture, flopped over, appears below the zero-amplitude axis, and the envelope is symmetrical about this axis, as it was in Fig. 2A. Remember that the only a.c. existing here has a frequency of 100 kc. (and some 99- and 101-kc. side frequencies that we won't discuss), and that there is no 1000-cycle component that we could find with a wave analyzer.

But consider the signal in Fig. 2C. Here a 1000-cycle signal and a 100-kc. signal exist in the same circuit. It is no longer symmetrical about the zero-amplitude axis. Instead, one signal is "superimposed" on the other, and a wave analyzer or tuned circuit could select one or the other quite easily. This is the basic difference between this "superimposed" wave and the "modulated" wave of Fig. 2B. In the superimposed waves, the peak-to-peak amplitude of each 100-kc. cycle is the same as that of the previous cycle, even though the excursion above and below the zero-amplitude axis is not always the same. And the envelope is not symmetrical about the zero-amplitude axis — it is as though the 1000-cycle signal had become the axis (dashed line).

Now that you can recognize the difference between superimposed signals and modulated signals, and know the effects of a.c. couplings, we are ready to talk about the mechanics of modulation in a diode.

### Modulation

If we feed the superimposed signals of Fig. 2C into a resistor (or into a good Class A or Class B amplifier of such bandwidth as to pass 1000 cycles and 100 kc.), they will come out looking exactly the same as they did at the input. But suppose we use the circuit of Fig. 3A, and feed them into a diode? The action can be analyzed by plotting the effect in the diode, as in Fig. 3B. Whenever the 100-kc. applied voltage swings to the right (is positive), the diode conducts and a half cycle of r.f. passes through  $R_1$ . Plotted against time, they would appear as the "output current" shown to the right of the diode characteristic. When the applied voltage swings negative, the diode will not conduct and no output current appears.

So far we have only half cycles of 100-kc. r.f., all swinging up from zero to an amplitude determined by the 1000-cycle signal that was superimposed on the original signal. You know that half cycles of any frequency contain harmonics of that frequency, so we can expect that the current through  $R_1$  is made up of a 1000-cycle component, a 100-kc. component, and some har-

monics of 100 kc. (There are also those side frequencies we mentioned earlier, but they are close to 100 kc. and its harmonics, and we will again ignore them in this discussion.) If now we connect a parallel circuit tuned to 100 kc. on the other side of  $C_2$  (as shown by the dotted lines), only the 100-kc. energy will appear across it, the other components being rejected by the selectivity of the circuit. The voltage across this tuned circuit will appear as in Fig. 3C, since the a.c. coupling (through  $C_2$ ) has made it necessary that each 100-kc. cycle swing as much below the axis as above. This figure we recognize as a modulated wave.

The diode characteristic shown in Fig. 3B is much too good to be true, and in practice it isn't a straight line from zero on up. A practical characteristic has some curvature, and so the usual practice in diode modulators is to use a large r.f. signal and a small audio signal. This has the effect of doing the actual work of modulating on a small relatively-straight portion of the diode characteristic, and simply means that you can't use a high percentage of modulation without running into distortion of the envelope. The same thing is true, of course, in plate-modulated Class C stages — you can't run high percentages of modulation without distortion — but there we don't worry about it so much. In the applications where diode modulators are used, we try to hold the distortion down as low as possible.

#### Balanced Modulators

A balanced modulator is a device for obtaining the side-frequency components of modulation without passing the carrier. In single-sideband transmitters, this is done prior to removing one of the sidebands with highly-selective circuits. While balanced modulators may take several different forms, they all serve the same basic purpose, and the various circuits involving diodes differ only in the frequency components (harmonics) that appear in the output.

The most common circuits are those shown in Fig. 4.<sup>1</sup> It is apparent in both that the carrier frequency cannot appear in the output because the net effect of the carrier across the output is zero, when there is no audio signal.

Now suppose that we disconnect the audio transformer and connect a small battery across points B and D in Fig. 4A, the positive terminal to B. Diodes AB and CD will be "biased back" by the amount of the battery voltage, and they will not conduct r.f. (of the proper polarity) until the r.f. voltage exceeds this bias value. The other two diodes, BC and AD, will conduct readily, however, and over more than half the r.f. cycle, because they are biased "forward." Since the one set of diodes is conducting better than the other, the circuit is no longer balanced, and r.f. will appear across the output. The fact that these are approximately half cycles of r.f. flowing through the diodes shouldn't bother you — remember that this is an a.c.-coupled affair and the

<sup>1</sup> A third type, the "series" modulator, is described by Berry in the Sept., 1952, QST.

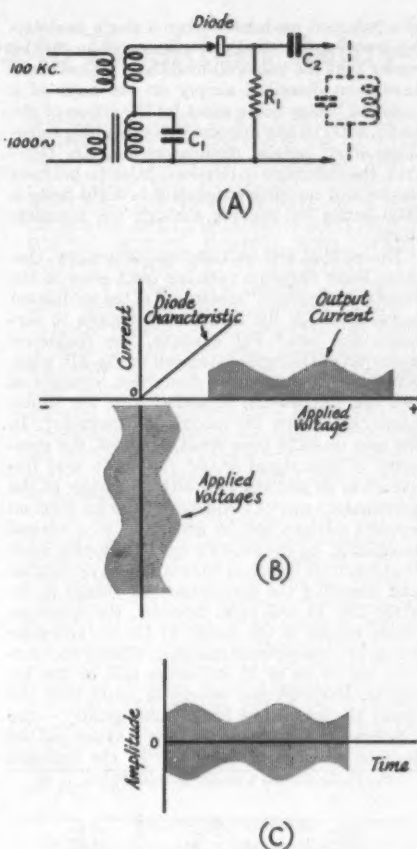


Fig. 3 — A basic diode-modulator circuit is shown in (A).  $C_1$  and  $C_2$  are by-passes for the 100-kc. signal.

The modulator action is shown at (B), where the envelope of the superimposed signals becomes a modulated envelope in the output. The a.c. coupling in the output of the modulator, and the tuned circuit, convert the "output current" envelope of (B) to the modulated-wave envelope of (C).

r.f. will be normal full cycles in the output. The more voltage applied, the more the unbalance, and the more r.f. there is in the output. When the polarity of the bias is reversed, the diodes BC and AD will be biased "back," and diodes AB and CD will be the easier paths.

Since the output depends upon the voltage across points B and D, if we reconnect our audio transformer and apply a single audio frequency, the r.f. output will appear in proportion to the audio voltage and regardless of its instantaneous polarity. Thus we will obtain an output like that of Fig. 5B when an audio voltage like that of Fig. 5A is applied. Anyone who has followed s.s.b. testing techniques will recognize this pattern as that of the "two-tone" test signal, but it should be apparent to all how it is the envelope pattern

of a balanced modulator when a single modulating frequency is used. It will also occur to the reader that the balanced-modulator action could have been described simply on the basis of a balanced bridge being upset by the action of the audio, without any introduction explaining something about normal modulators and a.c. However, the difference in envelope patterns between carrier and no-carrier signals is brought home a little better by running through the complete story.

Except that this isn't the complete story. One thing these envelope patterns can't show is the resultant frequency "spectrum" of the modulated wave, although the *Handbook* attempts to correlate the two.<sup>3</sup> For example, the frequency spectrum of the envelope shown in Fig. 5B, when generated in a balanced modulator, consists of two side frequencies, separated from the (eliminated) carrier by the modulation frequency. In the case we have been speaking about, the spectrum of this signal would show two side frequencies, 99 and 101 kc., with no energy at the (eliminated) carrier frequency of 100 kc. Such an envelope pattern can be generated in a normal modulator, by modulating with a complex wave that could be obtained from a full-wave rectifier and adjusting the modulation percentage to exactly 100. In this case, however, the spectrum would consist of the carrier at 100 kc. and side-frequency components spaced at 1000-cycle intervals out to 10 or 15 kc. either side of 100 kc. Hence, although the envelopes could look the same, the spectrums could differ greatly—the difference is in the phase of the r.f. cycles and the lack or presence of a carrier. In the balanced

<sup>3</sup> *The Radio Amateur's Handbook*, 1952 edition, p. 50.

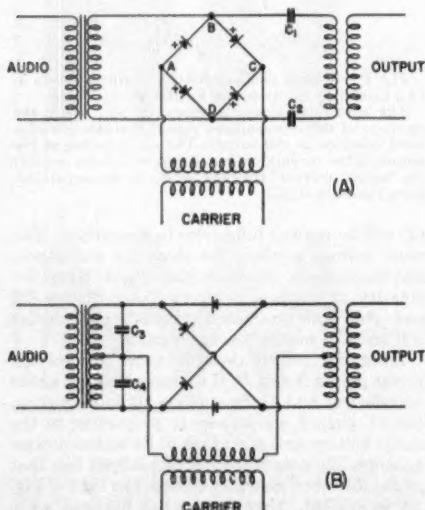


Fig. 4—The two common diode balanced-modulator circuits are (A) the bridge and (B) the ring. Condensers  $C_1$ ,  $C_2$ ,  $C_3$  and  $C_4$  are r.f. by-pass condensers, used to complete r.f. paths without short-circuiting the audio.

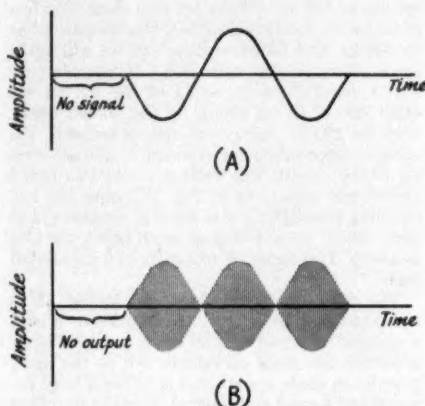


Fig. 5—A modulating signal as in (A) gives an r.f. output from a balanced modulator as in (B).

modulator, the phase of the r.f. in the output is reversed as the modulating signal passes through zero value, because the one pair of diodes takes over the job from the other, and routes the r.f. differently from its source to the output transformer.

#### Practical Considerations

It has already been mentioned that the ratio of modulating voltage to carrier voltage should be low in a diode modulator, if the distortion products are to be held to a low value, and this is equally true in the balanced-modulator application. Normal practice is to make the carrier voltage at least 10 to 20 times the peak modulating voltage. For germanium crystals and copper-oxide rectifiers, the r.f. voltage is usually on the order of 2 to 6 volts. The inherent carrier balance will sometimes run as high as 30 db. without any balancing adjustments, and with balancing (through circuits shown in any practical description) it will run to 60 or 70 db. Sideband energy is equal to the modulator power delivered, minus the resistance losses in the diodes, and these losses will run from 2 to 10 db. depending upon the carrier frequency. The rectifiers are in common use up to 4 Mc., and will be usable at higher frequencies with careful construction. A bugaboo at the higher frequencies is the variation in internal capacity of the rectifiers, and consequently they must be operated at lower impedance levels as the operating frequency is increased. From 600 to 1000 ohms is a practical level at 500 kc., but 50 to 100 ohms is recommended at 4 Mc.

—B. G.

#### Strays

W2KG, W4HB and W4JQ, who recently together shot rounds of 79, 77 and 76, respectively, on the West Palm Beach, Fla., Country Club course, challenge local or visiting amateurs to take them on individually or collectively.

# The 1953 Governors-to-President Relay

**I**n the year 1925, prior to the inaugural of President Coolidge, the first ARRL Governors-to-President Relay was held. At each presidential inauguration since that time, amateurs throughout the country and in all territorial possessions have taken part in the GPR, exhibiting the operating skills and achievements which have helped make this an outstanding event. In 1949, during the last GPR, the greatest number of states to date was heard from. At that time, a total of 41 states and 4 territories was reported as being active in the relay.

This year, upon occasion of the 7th Governors-to-President Relay, participating amateurs have established relay records which will be the standard to meet in years to come. Every one of the 48 states made report of its activity in the GPR; 47 states were heard from by radio. The actual number of originations of messages from state governors to the President-elect was 46. Two other states, Washington and New York, made repeated attempts to obtain messages from their Governors, but to no avail. Additional congratulatory messages were received from 3 territorial governors and several military commands. This outstanding showing reflects great credit upon the amateurs who participated in originating and relaying the messages and to the splendid coöperation of the Washington-area amateurs.

Coördinated under the able direction of their SCM, Jim John, W3OMN, amateurs in the Capitol area began a 24-hour alert at 5:00 P.M. EST on the evening of January 19th. Through intensive monitoring by the master station, W3PZA, the section net MDD, and individual amateurs throughout the area, all GPR messages were received and accounted for within 18 hours. The call of the hour, "CQ Washington de . . . GPR," brought results!

Eppa Darne, W3BWT, net manager of MDD and faithful GPR participant, reported MDD operating shifts manned by W3AKB, W3COK, W3ECP, W3MCG, W3NOE and W3QZC. Other MDD stations such as W3HC, W3JHW, W3JZY and W3TRN combed the bands for GPR traffic. The master station, W3PZA, staffed by W3CDQ, W3MSU, W3OMN and W3RNA, accounted for a large number of messages received. In addition to their air activity, the W3PZA operators took all incoming landwire messages, typing copies for the President and ARRL. The numbers of

messages accredited to the individual amateur stations on the receiving end of the GPR (messages) were K4USA (13), W3QZC (5), W3FQB (4), W3ECP (3), W4NF (3), W3OMN (3), W3PZA (3), W3CVC (2), W3NOE (2), W3MCG (2), and one each by W3AKB, W3BHV, W3CIC, W3CLY, W3FPT, W3HVL, W3IL, W3JQN, W3PFO, W3QQS, W3TNA and W4KFC.

Most of the traffic was handled on the 3.5-Mc. band with considerable additional activity on 75-meter 'phone and on forty and twenty meters. In spite of poor conditions, the quality of the operating personnel resulted in an unusually large number of state messages arriving in the key area without intermediary relays. Out of 46 congratulatory messages originated by 46 different states, 28 were received in Washington directly from the stations of origin! This impressive 61 per cent speaks for itself.

The unprecedented success of the 1953 relay was due not only to the individual amateurs who actually did the operation, but also to the SCMs and the amateurs in their sections who worked at cutting the red tape in the state capitols and who solicited the messages, to all the nets who participated, from section to transcontinental level, to the ARRL National Traffic System and its trunk line stations, to the splendid coöperation of the MARS operators and to the many non-amateur hands who so enthusiastically lent their support to help make the 1953 Governors-to-President Relay the most active to date. It was a job well done.

## Message Routings

All relay routes reported to ARRL are listed below. Unless otherwise noted the first call listed is that of the station of origin. A question mark indicates that no information is available on how the message got from one station to the next, whether through additional relay stations or direct.

Alabama: W4AUP-W4PWS-W4PL-K4USA.

Arizona: W7QZH via W7LVR-W4ZD-W4CAK-W6CIW/W- W2BTB-W3FPT.

Arkansas: W5AY-K4USA.

California: W6CIS/W- W4KFC.

Colorado: W0IC-W3ECP.

Connecticut: W1TIA/W1LKF-W3MCD-W3NOE.

Delaware: W3HC-W3AKB.

Florida: W1OMN-W3JQN.

(Continued on page 138)

◆

Texas, the biggest state in the Union, arranging to send congratulations to their first native-born President via the Governors-to-President Relay. *L. to r.*: W5GQ, originator of the Texas message, W5NZE past-president of the Austin Amateur Radio Club, and Governor Allan Shivers of Texas.

April 1953



# Getting Acquainted with the ARRL Lightning Calculator

*Tuned-Circuit Problems Made Easy*

BY DONALD H. MIX,\* WITS

THE ARRL Lightning Calculator, Type A, was devised by a ham who, like everyone else, found tank-coil calculations too complicated and time-consuming, and decided to do something about it. A very frequent problem in building a receiver or transmitter is the one of determining the dimensions of a coil to resonate at some desired frequency with some selected value of condenser capacitance. (For transmitters, there is a chart in the *Handbook* that tells you what tank capacitance you ought to use.) The first formula you have to use is the one that tells you what inductance is required to resonate with your condenser at the frequency you want to hit.

$$L = \frac{25,330}{f^2 C}$$

The units are in microhenrys, micromicrofarads and megacycles. It isn't a very complicated formula, but choose some values and see how long it takes to get the answer.

Now, let's see how it's done on the Calculator. On one of the scales (a portion is shown in Fig. 1) you will see an F. Immediately below is a rotating scale of frequency. Set the frequency you want to the F mark. Then below (Fig. 2), you will find, automatically lined up opposite each other, the numerous combinations of inductance and capacitance that will resonate at your frequency. You don't even have to find the decimal place.

## Coil Dimensions

Doing it the hard way, you now would have to calculate the coil dimensions that give you the required inductance. The formula is

$$N = \sqrt{\frac{3a + 9b}{0.2a^2}} \times L$$

\* Assistant Technical Editor, QST.

• Although the Type A Lightning Calculator has been available for nearly two decades, our Technical Information Service correspondence indicates that there are still many — old-timers as well as Novices — who either are not aware of its existence or have no idea what it is. It's really too bad, because perhaps next to a milliammeter, it is just about the most useful (as well as the cheapest) gadget a ham can have around the shack. If you don't believe it, read on.

where  $N$  is the number of turns,  $a$  the diameter and  $b$  the length of the coil. This turns out to be a lulu. The fact that most hams will consider it complicated is only the beginning. There are three unknowns. You have to decide the diameter and length before you know the number of turns. And then, when you find the number of turns, you'll probably discover that, with the size wire you want to use, the turns won't fit into the required length. So you pick another length and try again.

Here is where the Calculator really saves time and head-scratching. You have previously found the inductance you want. Below the inductance scale, you will find three wire-size scales (see Fig. 2), depending on the kind of insulation, i.e., enameled, silk, cotton, etc. Set the desired inductance value opposite the size wire you want to use. (We'll talk about wire size a little later.) Then, at the top of the Calculator (Fig. 1), you'll find, automatically lined up, all of the practical combinations of length and diameter that will give your inductance. Opposite each wire size on the scales below, you'll find a scale of turns per inch for each size of wire. To determine

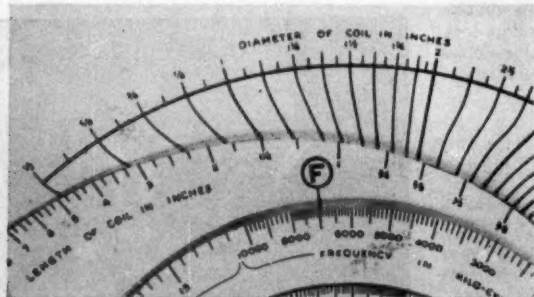
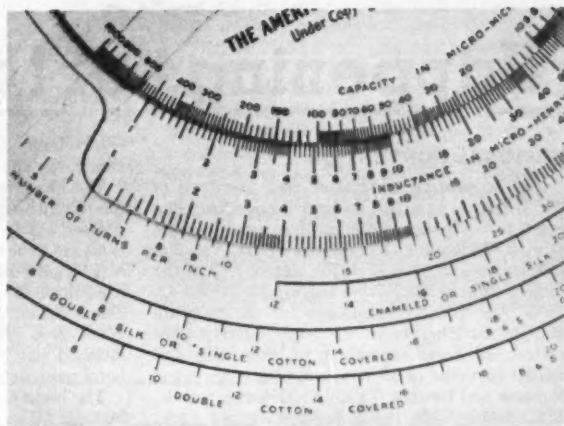


Fig. 1 — Frequency, diameter and length scales. The frequency set here is 7000 kc. For a capacitance of 50  $\mu$ fd. and a coil wound with 19 turns per inch (see Fig. 2) the various coil lengths and diameters are shown above. Examples: 1½-inch diameter, ¾ inch long; 1-inch diameter, 1½ inches long, etc.

Fig. 2—Inductance, capacitance and wire-size scales. For the 7-Mc. setting of Fig. 1, the Calculator shows various combinations of capacitance and inductance that will resonate. Examples: 50  $\mu\text{fd.}$ , 10.5  $\mu\text{h.}$ ; 100  $\mu\text{fd.}$ , 5.25  $\mu\text{h.}$ ; 35  $\mu\text{fd.}$ , 15  $\mu\text{h.}$ , etc. Below each of these will be found the largest size wire that can be used to fit the sizes of Fig. 1. This information, as well as that of Fig. 1, is obtained with one setting of the Calculator. By shifting the inductance line to line up with a different number of turns per inch, a whole new set of coil dimensions is obtained. The transparent celluloid indicator facilitates lining up the scales.



the number of turns for a close-wound coil, all you have to do is multiply your chosen coil length by the number of turns per inch. It's as easy as that! If you want a space-wound coil, set the inductance line opposite the line for half the number of turns per inch instead of the wire-size line. For example, the Calculator shows that a close-wound coil of No. 14 enameled runs 15 turns per inch. Set the inductance line opposite 7½ turns per inch for a double-spaced coil, etc.

Sometimes you have a coil form you want to use for a certain inductance and want to know what size wire you can use to get the needed inductance without running off the coil form. This is easy, too. On the top scales, set your form length opposite its diameter and at the bottom, opposite the inductance, read the maximum wire size that will fit. Similarly, you can measure the diameter and length of a coil and the turns per inch and find its inductance in about 15 seconds.

### Tuning Range

Another annoying bit of formula juggling that the Calculator makes light work of is the business of determining what range of frequencies a variable condenser will tune over with a given coil. Simply set the inductance value opposite the minimum capacitance and, under the F mark, read the maximum frequency. Then, move the inductance line opposite the maximum capacitance line and under the F index read the minimum frequency. You can, of course, just as easily reverse the process and find out how much capacitance variation you will need to cover a desired range of frequencies.

The scales cover frequencies from 150 Mc. to 400 kc., inductances from 1  $\mu\text{h.}$  to 1500  $\mu\text{h.}$ , capacitances from 3  $\mu\text{fd.}$  to 1000  $\mu\text{fd.}$ , wire sizes from No. 0 to No. 36, coil lengths from ¼ inch to 10 inches and diameters from ½ inch to 6 inches.

### Accuracy

The accuracy of the Calculator is well within

the limits that it is possible to approach in winding a coil. The only catch is that the actual capacitance across the coil is seldom known precisely. The capacitance-to-ground of the tube, socket, wiring, coil, coupling condenser, r.f. choke, and, most of all, the capacitance of the tuning-condenser stator to ground, all add to the value of capacitance marked on the tuning condenser by the manufacturer. Nevertheless, the important point is that if you use the values of tuning-condenser capacitance, minimum and maximum, specified by the maker, you will never end up with a coil that hasn't enough turns. You can always adjust the coil by removing turns instead of winding the whole coil over again. However, it is pretty safe to say that in a circuit of conventional design, using standard components, you will have to add at least 20  $\mu\text{fd.}$  to the minimum and maximum values specified for the tuning condenser if you use inductive coupling, and 30  $\mu\text{fd.}$  in the case of capacitance coupling with screen-grid tubes.

### Coil and Wire Size

Of course, the Calculator won't show you optimum coil dimensions nor the best wire size to use. In practice, the considerations of form and wire size for minimum loss often are less of a determining factor than the coil size that will fit into available space or will handle the required power without burning up. This is especially true in these days of screen-grid tubes where the relatively small driving power for the final amplifier can be obtained easily even if losses in the exciter are quite large. It may be considered preferable to take the power loss if the size of the exciter can be kept down by making the coils small.

The accompanying table shows typical conductor sizes that are usually found to be adequate for various power levels. For powers under 75 watts and for receivers, the minimum wire sizes shown are largely a matter of obtaining a coil of reasonable Q. So far as power is concerned,

(Continued on page 136)

# Happenings of the Month

## NATIONAL CONVENTION

The sponsoring committee and members of the Houston Amateur Radio Club are buckling down to work even harder as they come into the stretch of planning the Seventh ARRL National Convention, to be held in the largest city in the largest state of the Nation on July 10, 11 and 12, 1953. Although arrangements for the program and its participants are of course not yet completed, the hosts assure you of interesting and varied coverage of all ham subjects — technical lectures and forums, TVI, civil defense, mobile, DX, transmitter hunts, radioteletype, a.s.b., traffic nets, emergency communications, contests, v.h.f.-u.h.f., and even ham TV. An initiation of the Royal Order of the Wouff Hong will be held. There'll be a delegation from ARRL Hq., and it is expected that Phil Rand, WIDBM, will present his famous TVI demonstration. For the ladies, social functions including luncheons, teas,

entertainment. A formal dance and banquet will climax the affair.

The Shamrock Hotel will be convention headquarters, though the banquet and some other activities will be held at the Rice. Room reservations are to be made directly with hotels or motor courts; get yours in early! Some of the hotels are, in addition to the Shamrock and Rice, the Lamar, Texas State, Ben Milam, and the Montague. Houston is called the most thoroughly air-conditioned city in America, with 3860 conditioned hotel rooms and 370 motor court units.

The registration fee is \$13.50 per person, and includes all the convention activities. There will be a pre-convention party the evening of July 9th, \$2 per person. Send your check or money order now, payable to the Houston Amateur Radio Club, to P. O. Box 10173, Garden Oaks Station, Houston 18, Texas.

May QST will have a complete story on convention plans.

Seventeen persons — nearly one-third the total of Hq. employees — have completed ten years or more of ARRL staff service. Shown at a recent gathering to commemorate the 25th anniversary of Circulation Supervisor Cecilia C. Hatch, and the 10th of Advertising Assistant Edgar D. Collins, are, *l. to r., seated*: Communications Department Administrative Aide Lillian M. Salter (22 years); Treasurer David H. Houghton (31); Mrs. Hatch; General Manager A. L. Budlong, WIBUD (29); Communications Manager F. E. Handy, W1BDI (28); Chief Accountant Alice V. Scanlan (24). *Standing*: Walter E. Bradley, W1FWH (11), Technical Information Service; Asst. Technical Editors Donald H. Mix, W1TS (19), and Byron Goolman, W1DX (17); Asst. Circulation Mgr. Harold K. Isham W1MFA (16); Mr. Collins; Technical Director George Grammer, W1DF (23); Circulation Supervisor Marion E. Bayrer (15); Technical Assistant C. Vernon Chambers, W1JEQ (23); Deputy Communications Manager Joseph A. Moskey, W1JMY (14); Asst. Secretary John Huntoon, W1LVQ (14). Absent, on a civil defense mission: Nat'l Emergency Coordinator George Hart, W1NJM (14). Total service represented: 335 years!



## BOARD MEETING

A special meeting of the Board of Directors of the ARRL has been called for May 8th in Hartford, Conn. At press time we have notice of several proposals which will be presented by Director Middleton, West Gulf Division. The Board will of course make its usual examination of ARRL and amateur affairs. In this connection amateurs and clubs are invited, as always, to express themselves to their directors concerning topics of the day, or to originate new proposals. The list is on page 8.

The May meeting is termed "special" because under the new charter the regular annual meeting is normally scheduled for sometime in the first quarter. Such a meeting was held, as required, but it was no surprise when no directors appeared

inasmuch as they had all earlier indicated inability to attend a meeting so early in the year.

Director Middleton's proposals are to establish a committee to investigate relationships between the staffs of FCC and ARRL; to provide verbatim transcripts of proceedings of Board meetings; to instruct Headquarters (or a qualified testing laboratory) to evaluate TV receivers, high- and low-pass filters, and TVI-treated transmitters advertised in *QST* as to their performance; to make space available in *QST* to any elected ARRL official; to sponsor an ARRL Technical Scholarship, leading to a year's paid employment in the Hq. lab., for which all amateurs under 21 would be eligible; and to establish an ARRL yearly Merit Award for outstanding technical contributions by an amateur.

# The Antenna Coupler Helps the Receiver, Too!

BY JOHN J. GLAUBER,\* W3GQD

**M**ANY amateurs do not give adequate attention to the most efficient means of coupling the receiver to the antenna. Where an antenna coupler is used, the antenna feeders are usually connected to the receiver by means of a single-pole double-throw relay in each feeder line, if balanced feeders are employed, or by a single-pole double-throw relay if coax is used. Sometimes an untuned pick-up coil is coupled to the tuner tank coil.

After completing a wide-range coupler with B & W type TVL coils, various means of coupling the receiver coax input to it were tried. The pick-up coil was tried because it offered flexibility for all-band operation with the possibility of eliminating costly relays. Because of the low-impedance coax input to the receiver, the pick-up coil, which was loosely coupled to the tank coil, required series tuning by a variable condenser. A 100- $\mu$ fd. tuning condenser was incorporated in the coupler, mounting it beneath the main chassis so as to be out of the direct field of the tank inductance and yet be adjustable from the front panel of the coupler by means of a knob.

A small d.p.s.t. normally-closed relay opens the receiver antenna and B+ during transmitting periods. A small coax relay is preferable for the antenna switching.

The advantages of this means of coupling the receiver to the antenna are obvious. The proper impedance match between antenna and receiver is readily obtained. The coupler tank is, as usual, tuned to the desired frequency. By adjusting the series variable condenser, the receiver input circuit is tuned to the same frequency. The condenser tuning is not critical and need not be varied over any one band.

The relay is mounted outside the coupler housing as indicated in Fig. 1. This is desirable as no supply lines enter the coupler housing and thus no r.f. is induced in the relay-solenoid windings and possibly the supply lines.

The appropriate receiver pick-up coil is plugged in place with the tank coil for the desired

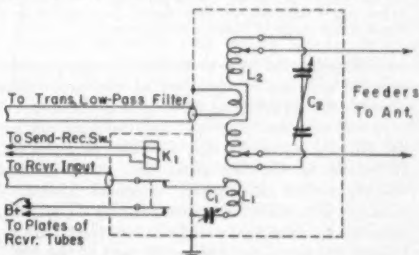


Fig. 1 — A separate link and coax line is provided for receiver input.

- C<sub>1</sub> — 100- $\mu$ fd. variable.
- L<sub>1</sub> — 3.5 Mc. — 35 turns, 1½ inches long.
- 7 Mc. — 19 turns, 1 inch long.
- 14 Mc. — 8 turns, ½ inch long.
- 28 Mc. — 4 turns, ¼ inch long.
- All coils wound with No. 26 enameled wire, 13½ inches diam. (National XR-6 forms).
- L<sub>2</sub>C<sub>2</sub> — Usual transmitter antenna-coupler coil and condenser.
- K<sub>1</sub> — D.p.s.t. normally-closed relay (coax type preferable).

band. A combination arrangement can be constructed in which the pick-up coil and tank inductance are integral so that both may be plugged in as a unit.

With C<sub>1</sub> tuned to resonance, a gain of six S units has been observed over the nonresonant condition, or with the condenser shorted.

\* 1014 Lansdale Ave., Lansdale, Penna.

# Wide-Band Re-Entrant Networks

## A Solution to the Problem of Amateur Antenna Loading

BY WILBURN D. FINGERS,\* WK4ZY

MANY times in amateur activities, it is taken for granted that a job can be finished. At this writing, it is by no means certain that the study to be described has been brought to any degree of conclusion.

Like many others, we have often been faced with the problem of loading the final properly. Many methods have been tried, and we have had some measure of success.

### A New Circuit

About one year ago, a new output circuit was evolved from a series of experiments. It is shown in Fig. 1. It became immediately evident that this circuit has great flexibility. Adjustments

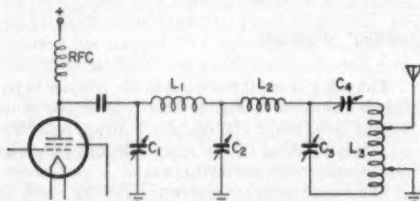


Fig. 1—The "pi-ip" antenna-coupler circuit uses a few more components than usual, but results in a much wider range of possible adjustments.

were found to be quite critical with regard to the type of antenna in use, but at the same time almost any variation of loading could be had.

It will be noted by some that the combination  $L_1$ ,  $C_1$ ,  $C_2$  resembles the familiar pi network. Reference to the *Handbook* and other articles will show that this circuit has great versatility of itself. The added elements,  $L_2$ ,  $L_3$ ,  $C_3$  and  $C_4$ , develop an imaginary impedance that can be considered to be the reverse of that of the "pi" network. It has therefore been aptly named the "ip" network,<sup>1</sup> to distinguish its function from the more usual parts of the circuit. Referring now to Fig. 1, we see that, without leaving any critical component values, at least five variable elements have been introduced into the over-all adjustment procedure. Assume that the setting of  $C_3$  is at some arbitrary value, then  $L_2$ ,  $C_3$  and the lower part of  $L_4$  up to the ground tap becomes a series-resonant circuit, which can absorb considerable power and pass it to ground at the particular frequency. This has proved to be a rather mixed blessing at times as the curves to be given later will show. Thus, the setting of  $C_3$  has considerable effect.

\* Canyall, Ga.

<sup>1</sup> Strictly speaking, an imaginary of this type calls for a  $j$  factor, and should therefore be written "jip." However, the  $j$  is omitted here in the interests of simplicity. — Ed.

• Antenna coupling and transmitter loading have always been confusing to many amateurs, and this article is intended to help in that direction. The mathematics has been edited out, in an effort to make this a "non-technical" article in every sense of the expression.

At the same time, the coil  $L_2$ , together with  $C_4$ , and the upper portion of  $L_3$  down to the antenna tap, must be considered a series-resonant circuit capable of conveying some power to the antenna. This is considered desirable. However, it has been found that we must be careful to tune to the proper frequency.

Looking at the "ip" network as a whole,  $C_3$ ,  $C_4$  and  $L_3$  form a network having parallel-resonant characteristics. Its tuning will be affected by  $C_3$  and  $C_4$  and also the setting of the taps on  $L_3$  and the loading presented by the antenna system. One begins now to see the flexibility built into the combination as it has evolved. Since  $L_3$  can be made plug-in, its value can be any reasonable one, and the taps can be placed anywhere on the coil.

### Applications

Let us now come to the application of this circuit and evaluate results in practical terms.

It was found, at first, that most of the possible-adjustment combinations resulted in curves such as shown in Fig. 2. The point where resonance

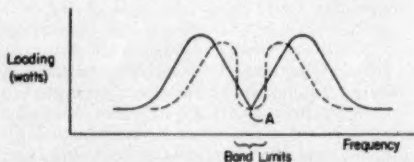


Fig. 2—Improper tuning of the "pi-ip" coupler will result in a "V" (solid line) or "M" (dashed line) characteristic. The point of minimum loading, marked "A," is called the "trap" or "suck-out" point, and is to be avoided.

was obtained for the final resulted in very light loading in the desired band. Some adjustments, of course, were found that gave very high loading. Most of these, however, gave very poor results and, after much testing and measurement, it was found that the trouble was an overly large fraction of the available r.f. flowing into  $L_2$ ,  $C_3$ , and  $L_3$  and going to ground. As this trouble had occurred often before with many types of output circuits, no special blame was put on the "ip"

network, but precautionary procedures to guard against this condition must be used.

At the present time, some experience has been gained in the adjustment of the "pi-ip" net to permit very useful operation. Fig. 3 is representative of the best results obtained so far.

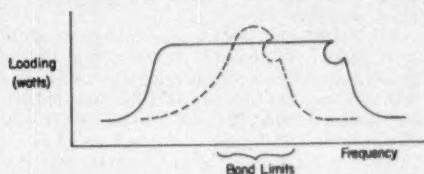


Fig. 3 — Proper tuning gives a broad coupling characteristic or a narrow one (dashed line), either of which can be adjusted to fit the band.

If the adjustment gives too flat a "top" to the curve, the best results will fall outside the band. However, because of the interacting nature of tuning  $C_3$  and  $C_4$ , the width of this flat top can be controlled.

### Results

When we began to get good reports using our newly-developed system, we then took several very exact plots on the frequency response using an ancient-but-accurate R-meter in combination with a Quite Stable Amplifier No. 5 built by a noted amateur manufacturer many years ago. S-meter readings could be expected to give comparable results.

All conditions of tuning that gave good reports turned out to conform with the curve shown in Fig. 4, the ideal of Fig. 3. The peculiar shaping of this curve and the unusual means of accomplishing it resulted in its being called the "S9"

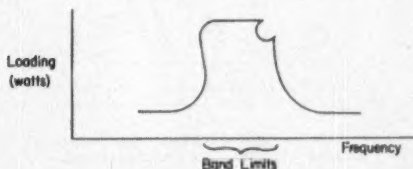


Fig. 4 — Perfect tuning of the coupler gives uniform loading across the entire band, with the exception of a residual suck-out point at the high-frequency end. In practice this is not too important.

curve. In achieving this we believe we have found what many amateurs are seeking.

This article has been hastily prepared so that as many as possible could take advantage of the experience gained so far. It is to be hoped that, in the near future, we can present a few more exact figures on performance and on the components to be used. In the meantime, we hope that every amateur station will report on its results with this loading method.

Full credit is given those amateurs in daily association with the author for the inspiration necessary for this article.

## Suitable Relays for the Ultimatic Key

MANY inquiries have been received asking about the feasibility of substituting relays other than those specified for the "Ultimatic" key (*QST*, February, 1953). Virtually any relay of 5000 ohms resistance or higher that can be adjusted to reasonable sensitivity and travel time will perform any of the functions in the Ultimatic. For example, the Potter-Brumfield LM11 10,000-ohm d.p.d.t. relay is satisfactory for  $K_1$ - $K_2$  and  $K_3$ - $K_4$ , and the Potter-Brumfield LM5 5000- or 10,000-ohm s.p.d.t. is suitable for  $K_5$ ,  $K_6$  and  $K_7$ . When relays are adjusted for other than 2-ma. operate/1-ma. release,  $R_9$ ,  $R_{14}$ ,  $R_{20}$ ,  $R_{22}$  and  $R_{25}$  must be modified to give a holding current halfway between the operate and release values.

When using relays of less sensitivity than the Sigma 4F,  $C_6$ ,  $C_7$  and  $C_8$  should be increased slightly for successful trip and release of the memories.  $R_{23}$  and  $R_{26}$  approximate the relay's resistance, although their values can be reduced somewhat to increase the relay pull-in current, if  $C_6$  is increased.  $R_{24}$  must then be modified to prevent reverse-current hang-up of the memory relays on clearance.  $R_{21}$  must provide adequate current for the snappy closure of  $K_5$ .

If high-current (3- to 6-ma. operate) relays are used, it may be necessary to increase the power-supply voltage to 200 or 250. Under these conditions, the cathode voltage dividers must be reportioned, to give slightly more than cut-off bias for  $V_5$  and  $V_6$  with the bus grounded and a  $V_3$  cathode potential equal to a bit more than  $V_4$  plate potential plus cut-off for  $V_3$ . With a higher supply voltage, the tube heaters should be tied to one-half the source voltage, and the time-base section should be fed 150 volts, regulated.

In the *QST* design, the time-base parameters were tailored so that the mark-space ratio of the multivibrator varies with speed to compensate for the mark-space ratio change with speed introduced by the finite armature travel time of the Sigma 4F relay (0.008-inch spacing, 2-ma. operate, 1-ma. release). Other relays, adjusted differently, would require modification of  $C_3$ ,  $R_5$  and possibly  $R_1$ . These changes should be checked with an ohmmeter connected across the output, watching the effect of speed changes on the mark-space ratio.

By splitting the wiring, removing the weight, and running the dot contact in to block the damper spring, a bug key can be used as an external control without any mechanical butchering.

— John Koye, W6SRV

**SWITCH  
TO SAFETY!**



# On the Air with SINGLE SIDEBAND

In the January issue this column reported that the then-current (September) roster of 75-meter s.s.b. stations showed a total of 237 stations. A new list, again compiled by W2SHN, W3ASW, W3KPP and W9DYV, and dated February 1st, shows 308 Ws, with 17 VEs and one KH6. The current group has W2 leading with 62, followed by 42 W9s and 41 W6s. The cellar honors still go to W5, with 10 representatives.

If Dick Long, W3ASW, hasn't worked the most s.s.b. stations it isn't from lack of trying. Since starting back in 1948, Dick has worked 300 different s.s.b. stations, which is probably the record at this time. But the actual number doesn't mean anything — what is noteworthy is the hours spent by pioneer stations like W3ASW in proving to the fraternity the worth and effectiveness of the mode, and the helping hands they offered to less-experienced operators.

Of course, everyone knows you have to be a radio engineer to use s.s.b. Granting that is a true statement, it's amazing how young the engineers

are these days. For example, there is Tom Blakeslee, W9TAP, in Winnetka, Ill. Latest reports had him active on 160 with a Multiphase Exciter and a TZ40 linear, when his daily work as a sophomore at New Trier High School will permit it. Tom is 14 years old — too young to know how tough s.s.b. is.

The Atlantic on 75 s.s.b. was a tougher nut to crack than was generally realized, but it has finally been crushed to smithereens. Possibly the first two-way was between W2PEO and OZ7BO on February 5th at 2245 GCT — at least it was almost certain to be the first OZ-W on 75 s.s.b. Dates are lacking on other contacts, but the Europeans getting across have included G3COJ, G3CWC, G3FHL, G3IMW and DL6WL. This side has been represented by W1IZY, W2JN, W2MTJ, W2SBI, W3BOL, W3QCM, W4IZL, W4MCL, W4NJC, W9UIT and VE1DZ, that we know of. The activity centers around 3800 kc., but the Europeans might be received a little better if they never went higher than 3790.

W2PEO has his sights set on working a VK or two on 75, but with no luck at this time of writing. Eric checks conditions by working VKs 5KO and 5JE on c.w. at 3510 kc., and he mentions that JYJ, a 1-kw. Japanese frequency-standard station on 4000 kc., is a good indicator of band conditions. JYJ must have fair strength before you hear anything but his carrier — when he comes up you can detect the 1000-cycle dash every second.

## Bandpass Crystal Filter for Receiving

KP4HF, Braulio Dueño, of Mayaguez, P. R., operates s.s.b. in the 14-Mc. band with a crystal-exciter rig. He uses a slick receiving stunt, shown in Fig. 1. It simply consists of

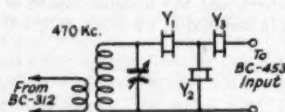


Fig. 1 — KP4HF adds selectivity between his BC-312 receiver and the BC-453 "Q5-er" by using this crystal filter.

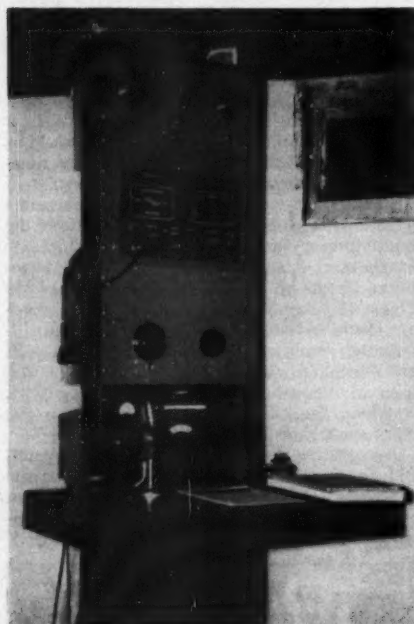
Y<sub>1</sub>, Y<sub>2</sub> — Channel 339 (470.833 kc.) surplus crystal.  
Y<sub>2</sub> — Channel 338 (469.44 kc.) surplus crystal.

adjacent-channel crystals used as a filter connection between his BC-312 receiver and the BC-453 "Q5-er." The crystals must be near or on the nominal i.f. of the receiver they are working out of, and the Q5-er is then set on them. The circuit tightens up the bandpass to about 1.3 kc., according to KP4HF.

## A Different Balanced Modulator and Crystal Filter

The s.s.b. rig used by Ken Stone, W7BMF, has several novel features in the exciter. For example, the balanced-modulator circuit (swiped from Motorola) doesn't require push-pull inputs of any kind, an advantage or convenience in many cases. As can be seen from Fig. 2, the carrier voltage is applied to the cathodes in parallel, and the modulating voltage is fed to one grid. A similar circuit is also used to convert the 450-kc. output of this unit to the operating frequency — VFO output is fed to the two cathodes and the 450-kc. s.s.b. signal goes to one grid.

The crystal filter uses adjacent-channel crystals (Y<sub>1</sub> and Y<sub>2</sub>). Tests on a single section of the filter show about 35-db. rejection, and the two cascaded sections measure up around



This is all there is to the s.s.b. station of Harold Gibson, W9PQO, at South Bend, Ind. A Multiphase Exciter drives a single 811-A amplifier to about 200 watts on peaks — the receiver is a 75A-2. Neat, compact, and effective.

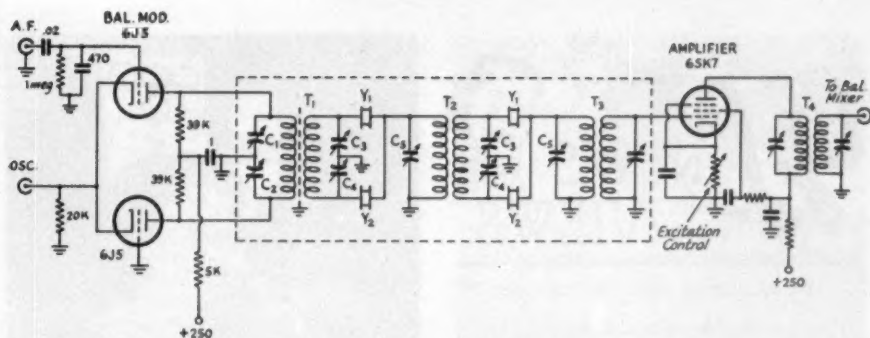


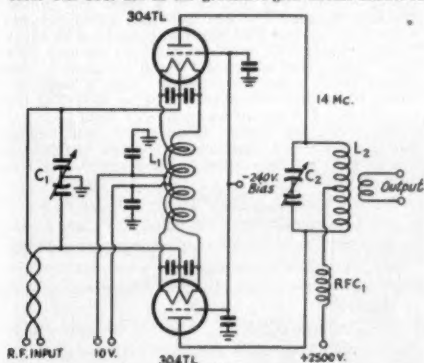
Fig. 2 — The balanced-modulator and crystal-filter circuit used by W7BMF. All transformers ( $T_1$ ,  $T_2$ ,  $T_3$  and  $T_4$ ) are standard types, with the phase-splitting condensers ( $C_1$ - $C_6$ ) added. These condensers are made of good quality mica in parallel with 50- $\mu$ fd. air trimmers. The Faraday shield between the windings of  $T_1$  is made by winding several turns of No. 18 d.c.c. between primary and secondary and grounding one end.

55 db. The filter was aligned with a signal generator, introduced at the audio-input terminal (oscillator turned off). The first step was to align all circuits to the mid-frequency between  $Y_1$  and  $Y_2$ . The signal generator is then set to a frequency about 3 kc. higher (or lower), and  $C_3$  and  $C_4$  are adjusted simultaneously until a very sharp null is obtained.  $C_5$  should be adjusted to the center of the passband, since improper adjustment will cause a large dip in response between the two crystal frequencies. It has been found that a 6-db. sag causes no impairment of voice quality, however, and it does improve the skirt selectivity. The adjustments may require several go-rounds, because they interlock slightly.

The final at W7BMF uses p.p. 807s, triode-connected with the grids and screens connected together and operated at zero bias. Plate voltage is 750.

### A High-Powered Grounded-Grid Linear Amplifier

Ed Brown, W9ROQ, has a pair of 304TLs in his 14-Mc. output amplifier driven by the p.p. 811A rig in the *Handbook*. The 304s are in the grounded-grid circuit shown in



# YL NEWS and VIEWS

BY ELEANOR WILSON,\* W1QON

## Can We Interest You?

While preparing a little "sales talk" in the hope of interesting more YLs in working the very high frequencies, the thought occurred that it would be best to let some of the YLs well known in v.h.f. circles try to "sell" the idea themselves.

Margaret Roberts, W8BFQ, winner of nine section awards in ten v.h.f. contests entered (national high scorer in the June, '52, affair), who has worked 41 states on Six and 21 states on Two, and who broke the world's 220-Mc. record last September by working W1HDQ (record since broken), seemed to sum up in one letter most of the thoughts of all of the girls contacted for the project, so we'll let Margaret do the first "commercial":

Remember 'way back, when everything "from 200 meters and down" was amateur territory? Well, perhaps it's very hard to sell an article until it's scarce, but I do hope you can help sell v.h.f. while there is plenty to go 'round. As for my story, all I can claim is enthusiasm, with maybe a little persistence [A little? — Ed.] thrown in. I'm neither a good rag-chewer nor an experimenter, and I have no scientific interest in radio, but I do have fun on v.h.f. I had fun on the lower frequencies also, but there's something about the very-highs — the friendly contacts, the exciting unpredictability, the freedom from QRM, the challenging ARRL v.h.f. contests. I've found the v.h.f. gang in general the most enthusiastic of all hams, and the good-fellow-

\*YL Editor, QST. Please send all contributions to W1QON's home QTH: 318 Fisher St., Walpole, Mass.



W4UDQ uses an SCR-522 at 15 watts, a crystal-controlled converter into an HRO and a "5-over-5" Yagi on 144 Mc. On 220 Mc. Dorothy has an 832 running at 20 watts, a 6J6 c.f. HFS-HRO receiving combination and a 32-element array.



W8BFQ operates 50, 144, 200, 420, 1215 and 2400 Mc. with inputs of 300, 800, 300, 50, 80 and 0.5 watts respectively. Margaret has worked seven states on 144-Mc. radioteletype and has earned DXCC, WAC and WAS on 28 Mc.

ship among them almost unbelievable. The v.h.f. contests furnish a lot of competition, but a lot more cooperation. Six-meter F-layer openings provided DX hunting as thrilling as any lower-frequency DX; sporadic-E openings were as exciting, and by reporting these openings to the Air Force through RASO I felt I was helping in a small way in the amateur tradition. I've watched the working ground-wave range on two meters grow, stayed up all night during tropospheric openings, strained my ears over weak signals and raised my blood pressure to the danger point when "impossible" signals were arriving by auroral reflection. Working W1HDQ for the 220-Mc. DX record was a greater thrill than my rarest DX on lower frequencies; and when W2QED's 420-Mc. signal came over the Alleghenies and he couldn't hear mine, I felt worse than if I'd missed AC4YN.

And so Margaret could go on and easily write several articles of her own filled with her experiences and reasons why she has been sold on v.h.f. Thoughts expressed in other letters received reinforce what Margaret has already said or implied.

Well-known W9DXX, Alice R. Bourke, who has worked some 325 different stations on two meters, writes that she likes v.h.f. "because of the high concentration of fine, friendly people who populate those frequencies."

WN9RUJ, Mary Meyer, a newcomer to v.h.f., is happy about the warm welcome the v.h.f. gang gives to new stations.

W4UDQ, Dorothy B. Wilson, knows that it's still possible to get excited over working a station only 75 miles away — if you're on 220 Mc.!

W8FMW, Ann Hughes, sums up the challenging surprise element in v.h.f. when she says that "you never know just what you are going to be

able to do. Like fishing, you never know what you're going to hook. There is something about it (two meters) that you can't give up after you once get acquainted with the band."

Intrigued with the higher frequencies since 1933, W2FHL, Viola Kapp, finds that "it is looking forward to the unexpected and freak conditions which holds the interest of the v.h.f. 'diehards'." Although Viola has worked 44 states on Six and 13 on Two and has regularly won v.h.f. contest awards, she uses low power and crystal control, using only one frequency on either two or six meters, thus proving what a simple, efficient rig along with a measure of stick-to-it-iveness can do on the higher frequencies.

And Marvel Sines, W8HUX, writes that she "has worked twelve states and many stations in Canada on Two. Of course, to those not having experience with v.h.f. that would not sound like very many. But when we work a new state on v.h.f. it is as much of a thrill as working a new country on some of the other bands. I wish more YLs and XYLs would get on. . . ."

Yes—we do too, Marvel. Sounds as if there's room, fun, and new experiences for all. See you in "the world above 50 Mc.!"

### Keeping Up With the Girls

There are now some thirty Z86 YLs. . . . W3CDQ, Liz, has been Asst. Atlantic Division Director for better than twelve years. . . . Ex-W0CCK is now W5YRT. Maxine writes that there is one other YL at her new QTH (Tyler, Texas) and that her name is Maxine also (W5VSN). . . . W3AKB, Fran, and W3MSU, Ethel, are members of the Washington chapter of the newly formed Society of Women Engineers. . . . OM W0GMZ calls attention to the fact that the early call of the late May Smith was 1BAE and not prefixed by a "W" as given in the Jan., '53, column. . . . W9MGT, Lenore, reports more new very young YLs in her radio classes at the Browning School, Granville, Wisconsin (see Nov., '52, column)—WN9s UCU, VAE and VCM, all age 9, and WN9VAP, age 14. . . . And 14-year-old W1WDX, Nancy, proudly reports that her 9-year-old sister Helen is WN1WYT. . . . VE8DF, Mary, of Whitehorse in the Yukon Territory, enjoyed a visit with

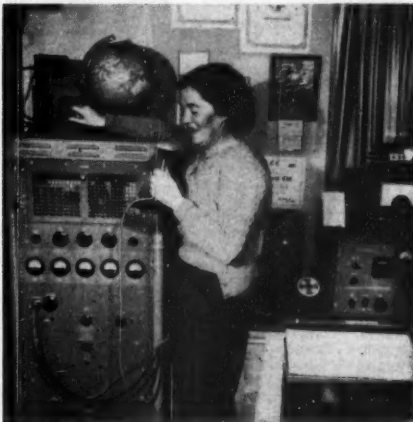


W2FHL has separate 829B rigs on Two and Six, 50 and 90 watts respectively. Viola uses a 6-element beam on 144 Mc. and a 4-element affair on 50 Mc.

KL7CY, Flo, at Anchorage, Alaska. . . . W4ITR is at present living in Baguio City in the Philippines. Ida, who worked 123 countries when in the States, is unhappy about a new ruling there which prohibits amateur operation by "aliens". . . . WN4WXF, Clara, is an enthusiastic new Novice from Antioch, Tenn. . . . New officers of the Long Island Unit of YLRL are Pres. W2KDP; V. P. W2BXT; Sec.-Treas. W2JZX; Board, W2s KEB and GRQ. . . . The day after OM WN2IQW worked his first YL, WN3-URU, Sara, of Norristown, Pa., Doc answered a CQ put out by WN3URT, June, who turned out to be Sara's twin sister! . . . W8GJX's (Helen Cloutier, Escanaba, Mich.) new novel *Sim Barton, Girl Radio Operator*, has recently been released. The story of a girl's determination to achieve success as a commercial radio operator on a Great Lakes' ship, the book should be of interest to young girls who aspire to be radio operators.

### Miscellany

The LARK (Ladies Amateur Radio Klub) of Chicago announces that a certificate will be awarded to any amateur (Continued on page 106)



W8FMW runs 250 watts to a home-built 2-meter transmitter and receives with a crystal-controlled converter ahead of a Super Pro. Anna's antenna is a 32-element array.



The 2-meter equipment at W9DXX includes an SCR-522 transmitter, an AR-88 with VHF-152A converter and a 5-element Yagi skywire. Alice also has worked her share of DX on the lower frequencies.

# Results—6th V.H.F. Sweepstakes

As it has in the five previous runnings of this popular event, the club award incentive brought out a large number of contestants. The tabulation of scores at the end of this department shows 385 reports, 20 more than in 1952, and an all-time high for a v.h.f. activity. This keeps the V.H.F. SS firmly established as one of the major ARRL operating activities, being topped in number of reporting contestants only by the Field Day, the regular Sweepstakes and the DX Contest.

Scores, the country over, were indicative of good activity, though there were no spectacular firsts or all-time highs in any particular field of endeavor. The country's top score was turned in by W2PAU, with 188 contacts on 6 and 2 meters, for a total of 3384 points. Just across the Delaware River, W3KKN was able to make 197 contacts, but he fell one section short of Brownie's 9, and so came up in second place, with 3152 points. The best single-band score was turned in by W3IBH, Philadelphia, who worked 183 different stations on 144 Mc. for 2928 points. Not many contestants reported work on 50 Mc. only, but of those who did, W1DJ, Winthrop, Mass., was top man, with 51 stations worked.

Scores are usually higher in the East, where large population centers and geographically small ARRL sections combine to make the numbers of stations and multipliers exceed those attainable in other sections. It is for this reason that competition is not carried out on a national scale. You compete only with others in your own section, and many scoring inequities are ironed out in this way. A glance through the tabulation will show that the top man in each ARRL section did an outstanding job in almost every case. Look at 120 contacts for W6TFZ in the Santa Clara Valley Section, or 107 for W6AJF in East Bay. One hundred and four contacts for 2496 points for W1RFU, 97 in Rhode Island by W1SGA, 78 and 90, respectively, in Western New York, for W2ORI and W2RUI, and many others with 50 or more stations worked show how well this party brings out the v.h.f. operators.

Among the clubs, it is usually a battle to the very end between the two giants of the Philadelphia area, the South Jersey Radio Association and the York Road Radio Club. This year the South Jersey gang pulled out in front by a substantial margin to win the silver-banded gavel for the highest club aggregate. A new club to place in the top three is the Nassau Radio Club of Long Island.

Though the club award guarantees a large turnout, there are many potentially strong clubs that never seem to participate. There should be at least twice as many entries in that column of club scores. It takes planning and coordination, but it's great fun — how about beginning now to have your club membership out in force for the next V.H.F. SS?

## CLUB SCORES

Club	Aggregate	Certificate Winner
South Jersey Radio Association	30,403	W2PAU
York Road Radio Club	25,835	W3KKN
Nassau Radio Club	6721	W2GLU
Hartford County Amateur Radio Assn.	3462	W1PHR
Hampden County Radio Club	3426	W1RFU
Lake Success Radio Club	3154	W2BNX/2
Providence Radio Association	2908	W1SGA
Waltham Amateur Radio Association	1657	W2BVU
El Ray Radio Club	1526	W1AQE
San Mateo County Amateur Radio Club	1524	W6TFZ
Northeast Radio Club	1190	WN3TYU
Old Colony Amateur Radio Association	876	—
Dayton Amateur Radio Association	820	W8LUZ
Rochester V.H.F. Group	782	W2OWF
West Side Radio Club	666	VE3AIB
Lakeland Amateur Radio Association	648	W2RQI
Philadelphia High Frequency Club	600	W3QAS
Sonoma County Radio Amateurs	204	—

In the tabulation to follow, the columns give the total score, the number of contacts made, the section multiplier, and the bands used, A being for 50 Mc., B 144 Mc., C 220 Mc. and D 420 Mc. No contacts were reported for any higher band. The club listing gives the combined club total and the call of the winner of the certificate for the highest individual score in the club. The first call in each section listing is the winner of a certificate award unless otherwise noted.

## ATLANTIC DIVISION

### Eastern Pennsylvania

W3KKN	3152-107-8-A-B
W3UKI	3141-176-9-A-B
W3IBH	2928-183-8-B
W3PKJ	1230-123-5-B
W3BQY	1060-106-5-B
W3GRY	1056-88-6-A-B
WN3TYX	1030-103-5-B
W3RZU	960-120-4-B
W3NXT	910-91-5-B
W3SAO	880-110-4-B
W3IAU	816-102-4-B
W3QVK	714-119-3-A-B
W3SOB	688-86-4-B
W3MQU/3	678-113-3-A-B
W3RFI	666-111-3-A-B
W3ANK	650-82-4-B
W3NKD	630-105-3-B
W3CLT	528-67-4-A-B
WN3TYU	492-82-3-B
W3KIW	486-81-3-A-B
W3QXY	486-81-3-B
W3OCU	468-78-3-B
W3AJF	432-72-3-A-B
W3UMT	372-93-2-B
W3DJ	372-62-3-B
W3SMK	344-86-2-B
W3NLL	340-85-2-B
W3FSC	316-79-2-B
W3AJN	288-48-3-A-B
W3QAS	230-70-2-B
W3DHH	208-67-2-B
W3LVF	204-44-3-A-B
W3HWV	232-58-2-B
W3WW	220-55-2-B
W3TDF	216-55-2-B
W3KDH	216-54-2-A-B

W3IND	212-83-3-B
WN3UMI	212-33-2-B
W3ULC	204-51-2-B
W3QKW	200-50-3-B
W3QB	192-48-2-B
W3KD	160-40-2-B
W3RAA	160-40-2-A-B
W3SON	120-30-2-B
W3BX	116-29-2-B
W3SBD	104-26-2-B
W3AYG	100-25-2-B
W3PNL	96-24-2-B
W3KIY	76-19-2-B
W3QV	60-15-2-B
W3IHF	28-7-2-B
W3BWQ/1	1356-113-6-B
WN3TYK	252-63-2-B

### Md.-Del.-D. C.

W3LMC	774-65-6-B
W3CGV	444-57-4-A-B
W3RUA	336-42-4-B
W3RKQ	93-16-3-B-D
W3PZK	76-19-2-B
W3RAH	54-9-3-B
W3BNC	54-9-3-B
W3MIR	40-10-2-B
W3NH	32-8-2-B
W3VAM	16-4-2-B
W2PTM/M	2-1-1-B

### Southern New Jersey

W2PAU	3384-188-9-A-B
W2QED	2080-130-8-A-B-D
W2BV	1800-135-7-B
W2JAV	1620-135-6-B
W2BLV	1320-132-5-B-D
W2GLV	1110-111-5-B
W2NFL	944-118-4-B

W2EWN 628-116-4-B  
W2HMP 850-85-5-B  
W2SPV 750-75-5-B  
W2REB 720-90-4-B  
W2TJX 702-117-3-B  
W2YTT 696-87-4-B  
W2DAJ 618-103-3-B  
W2KHW 612-102-3-B  
W2CNI 582-97-3-B  
W2JRO 552-92-3-B  
W2GQO 540-90-3-B  
W2ADA 504-84-3-A-B  
W2LBX 450-75-3-B  
W2OQN 438-73-3-A-B  
W2ZUL 438-73-3-B  
W2DMU 432-67-3-A-B  
W2EXB 408-51-4-B  
W2UCV 372-93-2-B  
W3LTC/2 362-91-2-B  
W2AUA 360-36-5-B  
W2HEK 318-53-3-B-D  
W2ABQ 300-50-3-B  
W2VX 300-76-2-B  
K2ANW 288-72-2-B  
W2FXT 280-70-2-B  
K2AFJ 260-65-2-B  
W2PFQ 260-65-2-B  
W2EGP 244-61-2-B  
W2SDO 224-56-2-B  
W2BGF 200-50-2-B  
W2FEN 196-98-2-B  
W2KBR 184-46-2-B  
KN2AIS 180-45-2-B  
W2BAY 180-18-5-A  
WN2OGZ 176-44-2-B  
W2DSO 172-43-2-B  
W2TMM 150-15-5-B  
W2EET 140-35-2-A-B  
W2OWA 132-33-2-B  
W2ORA 120-20-3-A  
K2BQW 108-27-2-B  
W2AKI 72-18-2-B  
W2FRJ 48-12-2-B  
W2WKI 48-12-2-B  
W2PZX 44-11-2-B  
W2DGN/2 32-8-2-B  
W2UKU/2 28-7-2-B  
W2UNT 24-6-2-B  
W2PTM/2 8-4-1-B  
W2PZX 6-3-1-B  
W2TQ 2-1-1-B

*Western New York*  
W2ORI 780-78-5-B-D  
W2RUI 720-90-4-A-B  
W2ALR 480-60-4-B  
W2CCR 288-48-3-B  
W2OWF 288-36-4-B  
KN2ALZ 264-44-3-B  
W2SFW/2 132-22-3-B  
W2UTH 128-32-2-A-B  
W2TBD 120-30-2-B  
W2ZHB 108-27-2-B  
W2QY 92-23-2-B  
W2ELS 84-21-2-B  
W2VVG 80-20-2-B  
W2UVF 64-16-2-B  
W2YIE 34-17-1-B  
W2UAD 32-16-1-B  
W2UY5 32-16-1-B  
W2QHG 20-10-1-B  
W2PCG/2 296-37-4-B

*Western Pennsylvania*  
W3KWH 72-12-3-B  
W3KWL 72-18-2-B  
W3CJF 44-11-2-B

#### CENTRAL DIVISION

*Illinois*  
W9QXP 366-61-3-B  
W9JGA 306-51-3-B  
W9QKM 270-45-3-B  
W9CX 210-35-3-B  
W9KCW 204-34-3-B  
WN9EF 192-32-3-B

W9USI 192-32-3-B  
W9MBI 176-21-4-B-D  
W9ADO 96-24-3-B  
W9SSI 96-24-2-B  
W9PK 32-8-2-B

*Indiana*  
W9NJS 610-62-5-B  
W9ORZ 156-26-3-B  
W9BUM 56-14-2-B

*Wisconsin*  
W9BTI 332-42-4-B  
W9TQ 304-38-4-B  
W9LJV 272-34-4-B  
W9UJM 168-21-4-B  
W9UEK 162-27-3-B  
W9YEG 138-23-3-B  
W9FAN 132-17-4-B  
W9LJY/AM 96-16-3-B  
W9NVK 76-10-2-B  
W9DSF 48-12-2-B  
W9WTL 30-15-1-B

#### DAKOTA DIVISION

*Minnesota*  
W9QIN 208-26-4-A-B  
W9JHS 168-21-4-A-B  
W9OAC 168-21-4-B  
W9TKX 126-21-3-A-B  
W9TJF 114-19-3-A-B  
W9HXY 96-12-4-B

#### GREAT LAKES DIVISION

*Kentucky*  
W4PCT 228-38-3-B

*Michigan*  
W8GNN 232-29-4-B  
W8UMI 192-24-4-B  
W8DDO 153-26-3-B  
W8DIV 120-20-3-B  
W8IEE 102-17-3-B  
W8JXU 48-12-2-B  
W8GYU 44-11-2-B  
W8BGY 40-10-2-B  
W8NOH 10-5-1-B

*Ohio*  
W8BFQ 896-64-7-A-B-C-D  
W8LPD 282-42-3-A-B  
W8LUL 234-39-3-B  
W8SVI 204-34-3-B  
W8BMO 198-33-3-B  
W8SDJ 186-31-3-B  
W8NKT 168-28-3-B  
W8KQV 162-27-3-B  
W8LTT 112-28-4-B  
W8LOF 102-17-3-B  
W8UEY 38-10-2-B  
W8SMCW 22-11-1-B

#### HUDSON DIVISION

*Eastern New York*  
W2PCQ 784-56-7-B  
W2BVU 584-37-8-A-B  
W2PV 280-30-7-B  
W2ACY 180-18-5-B  
W2RTE 150-26-6-B  
W2KQ 2-1-1-C

*N. Y. C. L. I.*  
W2AOC 2320-145-8-B  
W2GMT 1820-130-7-B  
W2DHB 1764-147-6-B  
W2BNX/2 1135-114-5-B  
W2GLU 1030-103-5-B  
W2QAN 855-86-5-B  
W2HG 700-50-7-B  
W2KVF 608-87-4-B  
KN2BGM 696-87-4-B  
W2CET 698-56-6-B  
W2BTA 680-85-4-B  
W2IEJ 680-68-5-B  
W2KDI 573-96-3-B  
W2ONG 550-55-5-B  
W2ICU 510-51-8-B  
WN2MFN 476-60-4-B

W2EWI 462-77-3-B  
W2KQC 390-65-3-B  
W2DLO/2 368-61-3-B  
W2ODB 300-80-3-B  
W2JXX 304-40-3-B  
W2KIR 288-49-3-B  
W2IBQ 270-47-3-B  
W2AOD 270-46-3-B  
W2CBQ 270-46-3-B  
W2FI 246-41-3-B  
W2IFM 246-41-3-B  
W2KAC 234-39-3-B  
W2WCR 221-28-4-B  
W2KEB 216-54-2-B  
KN2BIC 216-54-2-B  
W2JBQ 204-51-2-B  
W2KAE 192-48-2-B  
W2IN 186-31-3-B  
W2IHQ 126-21-3-B  
W2JCI 120-30-2-B  
W2TUK 80-20-2-B  
W2ZFG 80-20-2-B  
W2QR 72-9-4-B  
W2BVL 66-33-1-B  
W2SBO 60-15-2-B  
W2CB 56-28-1-B  
W2QBR 48-24-1-B  
W2LGE 48-12-2-B  
W2BZZ 46-23-1-B  
W2OGA 46-23-1-B  
W2ZWB 44-11-3-B  
W2TNI 42-21-1-B  
W2VL 42-21-1-B  
W2FDM 40-20-1-B  
W2SPI 38-19-1-B  
W2UXY 38-19-1-B  
W2MFP 30-15-1-B  
W2HFM 22-11-1-B  
W2EBY 20-10-1-B  
W2OKX 18-9-1-B  
W2JRL 14-7-1-B  
W2PIB 14-7-1-B  
W2BRX 12-9-1-B  
W2MIZ 12-6-1-B  
W2ZUC 12-6-1-B  
W2BXT 8-4-1-B  
W2FDU 8-4-1-B  
K2ATV 6-3-1-B  
W2GG 366-61-3-B  
W2HNG 198-50-2-B

*Northern New Jersey*  
W2DWJ 2144-134-8-B  
W2QNZ 1440-91-8-B  
W2COT 1242-104-6-A-B  
W2AGL 670-67-5-B  
W2RQI 472-59-4-B  
W2PEV 128-16-4-A-B  
W2DZA 114-10-3-A-B-C  
KN2AIO 48-12-2-B

#### MIDWEST DIVISION

*Missouri*  
W9IHD 12-3-2-B

*NEW ENGLAND DIVISION*  
*Connecticut*  
W1HDQ 2046-93-11-A-B-D  
W1PHR 516-43-6-B  
W1HDF 492-33-6-A-B-D  
WN1VLH 375-38-5-B  
W1QBH 144-36-2-A-B-D  
W1VLK 128-32-3-A-B-D  
W1RVZ 124-31-3-B  
W1KOW 116-29-2-B  
W1OLG 108-18-3-B  
W1KHM 100-25-2-A-B  
W1RFJ 78-13-3-B  
W1RNT 64-18-2-A-B  
W1AW 60-30-2-A-B  
W1VXJ 56-14-2-B  
W1BDP 52-13-2-B  
WN1VNO 88-22-2-B

W1TXM 76-19-2-B

*Eastern Massachusetts*  
W1AIB 1548-129-6-A-B  
W1AQE 1080-90-6-A-B  
W1BJN 900-90-5-A-B  
W1RUU 630-63-3-A-B  
W1CPB 560-70-4-B  
W1QMN 544-68-4-A-B  
W1DJ 511-51-5-A  
W1HIL 450-45-5-A-B  
W1MCR 300-50-3-B  
W1PYM 276-46-3-B  
W1TQF 246-41-3-B  
W1JSM 234-39-3-B  
W1RO 210-21-5-A  
W1DPI 200-20-5-A  
W1LHV 192-32-3-B  
W1OTH 128-32-2-B  
W1QQW 84-14-3-B  
W1LUW 46-23-1-B  
W1CTR 38-19-1-B  
W1TVC 15-8-1-B  
W1MGF/M 6-3-1-A

*Western Massachusetts*  
W1RFU 2496-104-12-A-B  
W1GJO 1368-114-6-A-B  
WN1VNH 882-49-9-B  
W1ESA 30-9-2-B  
W1RYW 48-8-3-A

#### Rhode Island

W1SGA 970-97-5-A-B  
W1KCS 870-87-6-A-B  
W1BIL 370-56-3-B  
W1GBQ 230-45-3-B  
W1VDI 188-47-2-B  
W1KKE 150-39-2-B  
W1UEF 135-23-3-B  
W1VEM 128-32-2-B  
W1QLD 92-23-2-B  
W1CN 64-16-2-B  
W1AOP 60-15-2-A-B  
WN1VAY 56-14-2-B  
W1NER 20-10-1-B  
W1PAZ 12-6-1-B  
W1KKR 8-4-1-B  
W1BGM 8-4-1-B

#### Vermont

W1OUC/1 2-1-1-B  
WN1UZL 200-20-5-B

#### NORTHWESTERN DIVISION

##### Washington

W7IEE 56-28-1-A-B  
W7KO 38-19-1-A-B  
W7PXB 38-19-1-B  
W7AXS 24-12-1-A-B  
W7BB 12-6-1-B

#### PACIFIC DIVISION

##### Santa Clara Valley

W6TFE 1200-120-5-B  
W6CGA 850-85-5-B  
W6ZBS 180-18-5-A-B  
W6ZTP 72-12-3-B  
W6LMN 72-12-3-B  
W6PBV 6-3-1-B

##### East Bay

W6AJF 1070-107-5-A-B-C-D  
W6NHU 300-50-3-B

##### San Francisco

WN6MGO 114-19-3-B  
W6DTV 102-17-3-B  
W6OTW 102-17-3-B

##### Sacramento Valley

W6MIW 305-31-5-B  
W6OTN 240-30-4-B  
WN6RZZ 96-12-3-B

##### San Joaquin Valley

W6NGR 539-40-7-B

(Continued on page 140)

# The World Above 50 Mc.

150-1300 1500-2450 3300-2700 3650-5925 10,000-10,500 21,000-22,000 30,000-7

CONDUCTED BY E. P. TILTON,\* WHDQ

**T**HE January success of Project Moonbeam, reported last month, was no one-shot proposition. With a fixed antenna, the opportunities for tests don't come too often, but W4AO and W3GKP were ready for another try on Feb. 20th, the next time the moon was in the right place. With W3GKP at the controls, a series of test transmissions beginning at 10:15 A.M. was made from W4AO. Optimum time for echoes was expected to be between 10:40 and 10:50, and it turned out very nearly that way.

Many moon echoes were received at Falls Church between 10:34 and 10:53. The peak strength of the returning signals was slightly lower than in January, and fading was more rapid and violent. Up in Dunmore, Pa., W3LZD was having the best results to date. Ted's reception of the moon-reflected W4AO signal ran from 10:37 to 10:43, reappearing briefly at 10:49.

The release of information on the first successful amateur moon-reflection efforts, by means of W1AW Bulletins, nationwide ARRL press releases, and the story in March *QST* has caused widespread interest in further attempts at lunar DX. Many hams, it seems, have been working in this direction; quite a few of them with a good understanding of the difficulties involved. We offer the services of this department as a means of correlating effort. If you are working on a moon project, send us the information on your equipment and schedules. If there is sufficient response, we will arrange to supply interested workers with up-to-date information by mimeograph.

For those who would like to know more about what it takes to bounce a 2-meter signal off the moon, W4AO and W3GKP are in the process of compiling a comprehensive report on Project Moonbeam. We hope to have it for you in an early issue of *QST*.

## Here and There on the V.H.F. Bands

For years 6-meter men have wondered about the possibility of working Alaska on 50 Mc. There was a KL7 on for one big week end back in 1947 when the *Fa* m.u.f. was well above 50 Mc., and he made plenty of contacts all over the United States, but there has never been anyone on up there since, at the right times for sporadic-E DX. Teletype circuits operating close to the 50-Mc. band in the Pacific Northwest have been heard in many parts of this country and Canada, but so far as is known, no KL7 has been worked on 6 since the fall of '47.

Now we have prospects that something may be done about the lack of 50-Mc. KL7 DX this spring and summer. W8NQD, Ashland, Ohio, writes that W8JBB is Alaska bound, and equipment for 50 Mc. is ready to be sent to him as soon as he gets Air Force permission to operate.

\* V.H.F. Editor, *QST*.

The frequency will be 50.7 Mc., to get him out of the low-end QRM, and provision has been made to key the transmitter automatically for beacon purposes.

In one way or another, W8NQD provides us with most of our 6-meter news this month. Tom was listening on 6 the evening of Feb. 15th when he heard a foreign-language station calling CQ. The signal was typical DX, with a pronounced ripple and considerable carrier instability, and though it was heard only briefly (around 10:58 P.M. EST) it was tentatively identified as Italian. (It was definitely not Spanish, though somewhat similar.) The operator was calling CQ, but no call sign was heard. The frequency was about 50.1 Mc. Can anyone help out on this one? Foreign DX reports are rare enough these days to be of real interest!

Lastly, Tom reports that the 6-meter operators of Ashland County have gotten out a neat little certificate, the object of which is to stimulate activity in the area. This will be sent to anyone who can show proof of having worked three or more Ashland County stations on 50 Mc. Send calls and time of contacts to Tom Stene, R.D. 3, Ashland, Ohio.

At a time of year when 50-Mc. activity is at a low ebb in some quarters, it is refreshing to hear of groups that are working to promote greater use of this valuable portion of the spectrum. The Region 9 Amateur Radio Club (the area around Fitchburg, Mass.) has been particularly successful in this respect. Largely through the efforts of W1s GJO OGY BNO ACP GUI and EHH, there are now some 20 6-meter stations active, and more are in prospect. A v.h.f. night and hamfest in Fitchburg, February 20th, brought out more than 125 hams, mostly v.h.f. enthusiasts, from within a radius of 30 miles.

A newcomer to 50 Mc. in the Pittsburgh area is W3OHK. Art has been plugging away each Monday and Tuesday evening, but so far his only contact has been W3RUE, also of Pittsburgh. Art is on other evenings after 11:30 P.M. but has had no luck at this late hour to date. He expects to do all right when the band openings begin this spring, but in the meantime he'd like to hear from others within working radius, with a view to keeping regular 6-meterskeds.

The 6-meter band is working out nicely for civil defense communication in the Terre Haute, Indiana, area. W9ZHL says that there are now 14 fixed-frequency f.m. mobile units on 50.6 Mc., and another fixed or portable station for Red Cross or c.d. headquarters use. The range, mobile to base station, is about 35 miles, and mobile to mobile is good for 15 to 20 miles. In addition, nine battery portables, similar to the one described in May, 1951, have been built. These are all on 50.12 Mc. at present. W9ZHL wants it known that the big Turkey Run V.H.F. Picnic (that has developed into something of a national convention of v.h.f. enthusiasts) will be held this year on July 19th.

Up in Regina, Sask., VE5JK is working on 50 Mc. with VESCO in Moose Jaw. Tests have also been made between Saskatoon and the two above cities, but no contacts have been made as yet. Here's hoping these boys are on deck when the spring band openings come along. VE5 contacts are none too common on 50 Mc.!

W9QBH, Riverside, Ill., writes that he is compiling a directory of stations using fixed-frequency f.m. mobile or fixed-station gear on the v.h.f. bands. He will reproduce the list and send copies to anyone interested. The idea is to circulate this information so that fellows so equipped will be able to make maximum use of their mobile gear when traveling. Send details of equipment and frequency used to Robert J. Hajek, 495 Selbourne Road, Riverside, Ill.

Two-meter operation is on a nightly basis in northeastern South Dakota and northwestern Minnesota. The 9:30 P.M. schedule, started nearly five years ago, finds W8s BJV TI DID KQO and DXY calling in regularly. W8s

DB ORE and CJS are also heard from frequently. Coverage up to 100 miles is solid around the clock, in any season, and the 2-meter band is superior to any other for this sort of work. W0RRN, South Dakota SCM, passes along this information in the hope that more operators will join in, and that others at distant points will aim in that direction. Good contacts over distances of 150 to 200 miles are considered normal, despite an average power of only 100 watts.

Tried the new closed-spaced open-wire u.h.f. TV transmission lines yet? Gonset now supplies half-inch spaced line, and W0TJF is making it in quarter-inch spacing.

## 2-METER STANDINGS

Call States Areas Miles				Call States Areas Miles			
W1HDQ	18	6	850	W8SWV	7	2	—
W1WZY	16	6	750	W8FBT	6	2	500
W1RFU	15	7	1150	W8IRP	6	2	410
W1MNF	14	5	600	W8FSC	5	2	500
W1BCN	14	5	580	W8DFU	5	2	275
W1DJK	13	5	520				
W1CTW	12	4	500	W8PJA	3	3	1390
W1KLC	12	4	500	W8ZL	2	2	1400
				W8WSQ	2	2	1390
W2NLY	22	7	1050	W8NLZ	2	2	237
W2UK	21	7	1075	W8CGG	2	2	210
W2QED	15	7	1020	W8EXH	2	2	193
W2AZL	18	7	1050	W8ZEM/6	1	1	415
W2ORL	16	7	830	W8GDM	1	1	300
W2PAU	16	7	740	W8YYG	1	1	300
W2QNZ	14	6	400				
W2SFK	13	6	—	W8WJC	21	7	775
W2DFV	13	5	330	W8BQ	21	7	775
W2CET	13	5	405	W8WRN	19	7	670
W2UTH	12	7	880	W8WXV	18	8	1200
W2DPB	12	5	500	W8UKS	18	7	720
W2PHJ	12	5	—	W8DX	17	7	675
W2BVU	12	4	260	W8EP	17	7	—
				W8WSE	16	7	830
W3RUE	19	7	700	W8RWV	16	7	500
W3NKM	19	7	660	W8BAX	15	6	585
W3QKI	17	7	820				
W3KWL	16	7	720	W9FVJ	22	7	850
W3LNA	16	7	720	W9EQC	21	8	820
W3PH	16	7	—	W9BPV	20	7	1000
W3GKP	15	6	650	W9UCH	20	7	750
W3OWW	13	6	600	W9LF	19	—	—
W3KUX	12	5	575	W9WOK	17	6	600
W3PGV	12	5	—	W9MBL	16	7	660
W3LMC	11	4	400	W9BOV	15	6	—
				W9LEE	14	5	780
W4AO	20	7	950	W9AFT	14	—	—
W4HK	19	6	710	W9FAN	13	—	680
W4JFY	18	7	830	W9UTA	12	7	540
W4MKJ	16	7	665	W9GTA	11	5	540
W40XC	13	7	500	W9JBF	10	5	760
W4IKZ	13	5	650	W9DSP	10	4	700
W4JFU	13	5	720				
W4CLY	12	5	720	W9EMS	21	8	1175
W4JHC	12	5	720	W9NGUD	20	7	1065
W4OLK	12	5	720	W9HID	16	6	725
W4EFJ	12	5	700	W9NFM	14	7	660
W4UMF	12	5	600	W9ZJB	12	7	1097
W4LRR	5	2	900	W9INI	12	5	830
				W9WGG	11	5	760
W6TTI	14	5	670	W9OAC	11	5	725
W6RCL	14	4	790	W9JHS	9	3	—
W6QNL	10	5	1400	W9HXY	9	3	—
W6CVW	10	2	1180				
W6MWW	9	4	570	VE3AIB	17	7	850
W6AJG	9	3	1260	VE3DIR	14	7	790
W6ML	9	3	700	VE3BPB	12	6	715
W6ERD	8	3	570	VE3AQQ	11	7	800
W6ABN	8	2	780	VE1QY	11	4	900
W6VX	7	4	—	VE3DER	10	6	803
W6VY	7	3	1200	VE3BOW	8	5	520
W6FEK	7	2	580	VE3QN	7	3	540
W6ONS	7	2	950	VE3TN	7	4	480

Either of these lines should be fine for 220- and 420-Mc. use, if the problems posed by rotatable arrays can be solved. One way of fastening the line in place is suggested by W0TJF, who uses the standard insulated screw-eye fastener designed for TV installation work. Dick's quarter-inch spaced line will not permit use of these in the usual way (as a support for the polyethylene spreaders) but he finds that the mounting ring may be compressed so that the soft plastic insert clamps around the two wires. If this is done just below the spreader, the line is kept from slipping through the insulating mount. To keep the portion of the line between the last mount and the rotating portion of the array from shorting against the tower, Dick says that some fellows are covering the line with half-inch plastic tape, one thickness on each side, for the distance where there is danger of the line shorting to the metal tower. Flexible inserts of Twin-Lead may be used readily, as the impedance of the u.h.f. line is close to 300 ohms.

The 2-meter band can be "sold." Last month we reported that in crossband contacts with various 2-meter stations, while transmitting on 75, W9GFL, Green Bay, Wis., was able to receive on 2 solidly, while the fellows he worked had to battle QRM on his frequency. This sort of demonstration of the utility of 144 Mc. for extended-local communication has had a good effect, and several new stations are now using the band in the Green Bay area. W9s OPA HHD and IKY are among recent arrivals. A new v.h.f. club has been formed, with 28 members at the start. W9GFL heard 19 different 2-meter stations during the last month of operation.

W9LEE, Westboro, Wis., reports that his skeds with W8BBN, Grand Marais, Minn., now well into the second year, are running about 95 per cent successful, well ahead of last winter's record. This is a hop of more than 160 miles, the northern half of which is over Lake Superior, making it perhaps the northernmost path that is covered regularly on 144 Mc. in this country.

The new 6AJ4 and 6AM4 tubes are working out well in r.f. amplifier service at 144 Mc. and higher. The January issue of *I.R.E. Proceedings* shows the 6AJ4 as a grounded-grid amplifier that provides 7 db. gain on 900 Mc., so the tubes should do OK on 420. W9KQX is getting good results with two 6AJ4s in a push-pull grounded-grid amplifier on 144 Mc. This arrangement is particularly well adapted to use with balanced lines. Balanced tuned circuits are used in both cathode and plate circuits, with the input and cathode tapped down in the former. The output is taken off through small fixed condensers tapped on the plate coil, and a balanced line runs to the converter input. The preamplifier is made on a copper plate, with the five grid terminals of each socket soldered directly to this chassis. A shield across the two sockets further isolates the input and output circuits.

Not much 420-Mc. operating news this month, but there is much talk. Our guess is that both 220 and 420 are going to see big things being done this spring and summer. W2QED reports that he has been able to make at least a few contacts each Thursday night on his 10 p.m. 420-Mc. schedules, and now he is trying Tuesdays, also.

W2GTY and W2UZR, near neighbors in Brooklyn, are looking for 420-Mc. QSOs. One or the other calls CQ on 428 Mc. nightly at 2300, and at 1630 on Saturdays. Both use converted BC-645s.

Here in West Hartford, W1QVF has a beautiful 4X-150A amplifier running straight through on 432 Mc., driven by a 5894 (9003) amplifier. He is working toward TV operation. W1AVK, in Springfield, also has a TV rig about ready to go. W1VLK, Wethersfield, Conn., has gone to crystal control, having come on 432.9 Mc., with an 832A tripler.

Out in Detroit, W8JXV is on the air with a flying-spot scanner and a 9003 final stage. A modified Mallory 101 TV converter is used for reception. He is working on a 5527 camera unit, that may be in operation before this appears in print. Another budding TV enthusiast is W2JAV, Hammonont, N. J.

## On Using the 6146 Single-Ended

In QST for November, 1952, W1JEQ described a push-pull amplifier for 144 Mc. using a pair of 6146s. We know of many instances where this amplifier has been duplicated with good results, but some fellows who have tried to use a single 6146 on 144 Mc. have not been so fortunate. One

# 50 WAS Mc.

W0ZJB.....48	W4BEN.....35	W8BFQ.....41
W0ZJV.....48	W8OJN.....39	W8LPD.....37
W0CJS.....48	W5VY.....48	W8ZHB.....48
W5AJG.....48	W5GNQ.....46	W9QUV.....48
W9ZHL.....48	W5MJD.....46	W9HGE.....47
W9OCA.....48	W5ONS.....45	W9PK.....47
W6OB.....48	W5JTL.....44	W9VZP.....47
W9INI.....48	W5ML.....44	W9RQM.....47
W1HDQ.....48	W5JLY.....43	W9ALU.....47
	W5JME.....43	W9UIA.....45
W1CLS.....46	W8SFV.....42	W9UNS.....45
W1CGY.....46	W8VY.....42	
W1LLL.....45	W8FAL.....41	W9QIN.....47
W1HMS.....43	W8FSC.....41	W9DZM.....47
W1LSN.....42	W8HLD.....40	W9NFM.....47
W1DJ.....40	W8HEZ.....38	W9TKX.....47
	W8LIU.....37	W9KYF.....47
W2AMJ.....46		W9HVW.....48
W2RLV.....45	W6WNN.....48	W9MVG.....44
W2MEU.....45	W6UXN.....47	W9JOL.....44
W2IDZ.....45	W6ANN.....45	W9TJP.....44
W2FJH.....44	W6TML.....45	W9JHS.....43
W2GYV.....40	W6IWS.....41	W9PKD.....43
W2QVH.....38	W6OVK.....40	W9PL.....41
W2ZUW.....35	W6GCG.....35	
W3OJU.....45	W7HEA.....47	VE3ANY.....42
W3NKM.....41	W7ERA.....47	VE3AET.....38
W3MQU.....39	W7BQX.....47	VE1QZ.....34
W3RUE.....37	W7FDJ.....46	VE1QY.....31
W3OTC.....35	W7DYD.....45	C66WW.....21
W3FPH.....35	W7JRG.....44	XEIGE.....19
	W7BOC.....42	
W4FBH.....46	W7JPA.....42	
W4EQM.....44	W7FIV.....41	
W4QN.....44	W7CAM.....40	
W4FWH.....42	W7ACD.....40	
W4CPZ.....42		
W4FLW.....42	W8NES.....46	
W4MS.....40	W8NQD.....45	
W4OXC.....40	W8UZ.....45	
W4FNR.....39	W8CMS.....43	
W4IUI.....38	W8YLS.....41	
	W8RFW.....41	

old hand who has made the 6146 tick in satisfactory fashion is W1HDF. Perhaps some of the tricks he employed will be helpful to others who want to use this popular bottle on 144 Mc.

Carl took on the 6146 when a local Novice-to-be brought him a rig he'd built. There was oscillation all over the place in this typical first attempt at transmitter construction, so W1HDF decided on a complete redesigning job. The result was the construction of the complete r.f. section on a copper plate, with a coaxial-line tank circuit for the 6146. Whether the coaxial plate tank contributes appreciably to the efficiency of the amplifier is debatable, but it does provide a highly effective method of isolating the input and output circuits. The outer conductor is a copper sleeve about 3 inches in diameter and 9 inches long, with rows of quarter-inch holes drilled around the cylinder about a half inch from each end.

The inner conductor is a 5-inch piece of 1/4-inch copper tubing, with a slip-on plate cap at one end and a capacity plate at the other. The plate is separated from the flat end plate of the outer conductor by a thin sheet of polystyrene. Tuning is by means of a copper disk driven by a quarter-inch shaft threaded through the outer conductor. A similar fixed plate is soldered to the inner conductor at the tube end of the line.

The 6146 socket is mounted so that the cathode connections can be soldered to the chassis in the most direct man-

ner possible. Neutralization is aided by capacity tabs soldered to the screen terminal and to the chassis. No other neutralization was needed, though some layout variations may require plate-to-grid capacitance added to that inherent in the tube. Suitable capacitors for neutralizing tetrodes have been hard to come by in the past, but the new low-range plastic trimmers by Erie and others are practically tailor-made for the purpose.

Anyone thinking in terms of a half-watt driver stage for the 6146 amplifier is doomed to disappointment. Don't try to drive a 6146 amplifier on 144 Mc. with less than 4 or 5 watts output from the succeeding stage. This can be obtained from a 5763 doubler, but only if that stage, too, is adequately driven. This is a weak spot in many layouts. Don't try to skimp on the exciter stages, or plan on pushing exciter tubes to the limit of their capabilities on lower frequencies.

Tetrode amplifiers can be made to operate stably on 144 Mc. A good check is to tune the plate circuit while watching the grid and plate currents simultaneously. If the stage is thoroughly neutralized, the plate current will dip to minimum and the grid current will rise to maximum at the same setting of the tank condenser. This is likely to be the most sensitive check on tetrode neutralization, and is preferable to the feed-through and no-plate-voltage grid-current reading tests more often used.



**25 Years Ago**  
this month

April 1928

... This month's editorial suggests cooperative DX-band subdividing to minimize anticipated QRM difficulties in international amateur communications.

... ARRL Secretary Warner reports on much ground covered at the League's regular annual Board of Directors meeting held in late February.

... "Keying Master-Oscillator Circuits," by Beverly Dudley, 9BR, gives a discussion on the pros and cons of oscillator, amplifier, and oscillator-amplifier keying.

... S. P. McMin, 2WC, puts three Type 210 tubes to work in a crystal-controlled low-power transmitter capable of operation on four amateur bands.

... James J. Lamb, 3CEI, furnishes constructional details on "A Portable Receiver" employing three tubes and covering 43.5 through 10 meters.

... F. Austin Liddbury writes on "Easy Tuning in the Short-Wave Bands" and there appears an ARRL lab report on the newly available UX-250/350 tube.

... "Notes on the Design of Iron-Core Reactances Which Carry Direct Current," by D. E. Replogle, brings us word of late developments in this field.

... R. C. Hitchcock, in "Designing Fixed Resistors," shows that the manufacturing of reliable resistance components is much more complex than meets the eye.

... "Variable A-, B- and C-Power from D.C. Mains" is readily obtainable if you follow the suggestions outlined by F. I. Anderson.

... "Some Investigations of Short Waves at Nijni-Novgorod," by Wladyslaw W. Graybowski, r1WX, gives us some details on the state of the art in the U.S.S.R.

... The novel "Transmitter Without Transformers," by L. W. Hatry, uses two Type 171 tubes in a full-wave self-rectifying circuit.

... A flash appears in the Communications Department to announce opening of the new ten-meter band for general amateur use.

... A complete description of widely-worked 8DP0, Wheeling, W. Va., includes information on the station's effective two-tube multiband c.w. transmitter.

... The Communications Department informs that ARRL Hq. station 1MK has moved to a new and more favorable location at Brainard Field, Hartford.

# The Radio Amateur Civil Emergency Service

## PART II—The Communications Plan, Station and Operator Authorizations

### The Communications Plan

One of the knottiest problems in laying the groundwork for RACES is the preparation of the Communications Plan that must be approved through FCDA channels to FCC and back before any RACES authorizations can be issued. So far as RACES is concerned, this plan need not outline in detail all phases of c.d. communications planning for operation on the designated RACES frequencies. However, the plan, in order to qualify for FCC approval, must satisfactorily meet the requirements as stated in the regulations. *The first thing to do is read them, and read them carefully.*

There have been many questions and much correspondence concerning this RACES Communications Plan, so let's dwell on it for a moment. The Communications Plan is by far the most important element of a RACES application and must be approved and on file at FCC before any authorizations whatsoever will be issued or even considered. The Plan comes first. Of the several which have been submitted so far, some have not been approved because of lack of detail. They are too vague, too general, show all too clearly that communications wise the local CD organization is not ready to go. Your RACES organization cannot proceed faster than the rest of your civil defense organization; that is, it cannot set up plans to provide communications for civil defense activities or installations until such activities or installations exist or are definitely planned. Thus, there is no use trying to get ahead with RACES by submitting a communications plan full of blanks cloaked in generalities. We amateurs, as amateurs, can do nothing to organize civil defense. We can only provide a radio communications service for a civil defense organization that exists or is well along in planning stages. If there is no civil defense, there can be no RACES. That much is a cold, hard fact.

FCDA has written up a "check list" for the RACES communications plan to assist in ironing out this problem, which has been one of the toughest ones for most communities to meet. Space does not permit its reproduction here, but we'll gladly send you a copy on request if you have not already received it through other channels. If all items in this check list are covered, there should be little doubt that the plan will be approved by both FCC and FCDA.

Every well-organized community will have a civil defense plan. The plan may be included under one cover or under several, one for each phase, depending largely on the size of the community in question. Such plans are the culmina-

• Much of the confusion concerning RACES implementation which now exists stems from one principal cause — failure to read the new RACES regulations carefully. This installment dwells on matters about which there is considerable uncertainty in the field. It may help you to understand the regulations, but we hope you will read them carefully first.

tion of the combined efforts of the various community civil defense heads, of which the communications officer is one. Radio and RACES will be worked into it, depending on the extent to which this is possible at the time the plan is devised. The Radio Officer, when preparing his Communications Plan for RACES, might use this as a basis, enlarging on it as required by the RACES regulations.

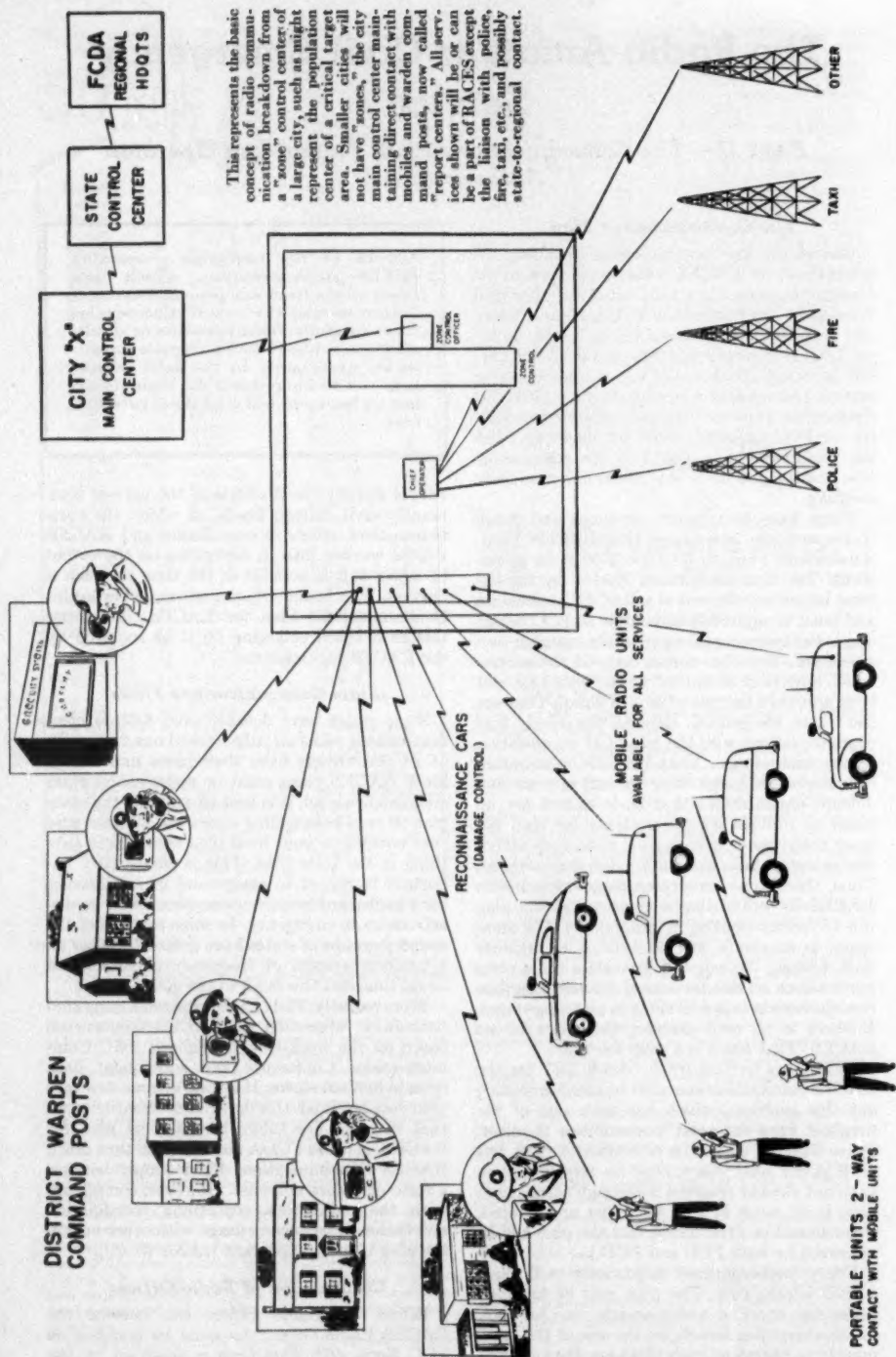
### State Communications Plans

Some states have detailed civil defense communications plans already worked out and on file at FCDA. Others have their plans under way. Since RACES plans must be approved at state civil defense level, it is best to examine the state plan (if any) before filing your own, to make sure that nothing in your local plan contradicts anything in the state plan. This is particularly important in regard to assignment of frequencies, for a haphazard frequency-use plan could be disastrous in an emergency. In some sections of the country groups of states have gotten together on a uniform system of frequency allocations to avoid this, and this is all to the good.

More recently, FCDA has prepared a suggested nationwide allocation of RACES frequencies, based on the week-long December, 1951, Communications Conference and subsequent data from individual states. If a state communications plan does not exist, this does not necessarily mean that it is no use submitting a local plan for RACES. Neither FCDA nor FCC will turn down RACES Communications Plans simply because a state plan does not exist. However, compliance with the regulations concerning coordination and liaison of frequency usage with other nets in the area is most important [12.201 (i) (5)].

### Certification of Radio Officer

Before the Radio Officer can become the RACES Radio Officer, he must be certified on FCC Form 482. This form is executed by the



This represents the basic concept of radio communication breakdown from a "zone" control center of a large city, such as might represent the population center of a critical target area. Smaller cities will not have "zones," the city main control center maintaining direct contact with command posts, now called "report centers." All services shown will be or can be a part of RACES except the liaison with police, fire, taxi, etc., and possibly state-to-regional contact.

DISTRICT WARDEN  
COMMAND POSTS

RECONNAISSANCE CARS  
(DAMAGE CONTROL)

MOBILE RADIO UNITS  
AVAILABLE FOR ALL SERVICES

PORTABLE UNITS 2-WAY  
CONTACT WITH MOBILE UNITS

local civil defense director and usually can and should accompany the local Communications Plan when it is submitted, but no RO certifications can be made until or unless the communications plan has been approved at all levels. So far as FCC is concerned, the filing of this form is informational; no approval or disapproval is involved. FCC merely wants to know who the RO is and that he has been investigated as to loyalty and reliability. The RO may be a licensed amateur of Conditional Class or better, or a commercial radiotelegraph or radiotelephone operator of first or second class. It goes without saying that 90% or more of them will be amateurs.

### Station Authorizations

These are applied for on FCC Form 481 after or concurrent with submission of the Communications Plan and Certification of the Radio Officer. No new station licenses are issued; the presently-held amateur station license is simply made valid for RACES operation. Novice and Technician station licenses are not eligible to be made valid for RACES operation. FCC Form 481 is divided into three segments, labeled 481-1, 481-2 and 481-3. The applicant fills in only 481-1 (which must also be signed by the Radio Officer). FCC detaches this application, returns the RACES authorization (481-2) to the Radio Officer who detaches the stub (481-3) for his records before passing the station authorization along to the applicant. Once the Communications Plan and Form 482 have been approved at all necessary civil defense levels and are on file at FCC, applications for station authorizations should be submitted direct to FCC, referring to the approved plan in each application in the space provided. Such applications should be submitted in groups if feasible. *Applications will be returned without action unless FCC has an approved RACES Communications Plan for that community or other local area (not state) on file.* Authorizations at community<sup>1</sup> level will not be issued on the basis of a state plan alone.

Some communities are preparing to operate their entire RACES establishment under a single station authorization. In such cases it is planned to have the Radio Officer (or other participating amateur) take out a separate station license other than his own, on the basis of community-owned equipment at a separate location. The community or whoever owns the equipment must assign technical control of the equipment to that amateur. All other station units in the local RACES organization will then operate as sub-units of that licensee under the RACES rules [12.245 (b)]. This plan has the advantage of simplicity in licensing, control and identification; that is, only one station authorization need be obtained, control is centralized in the licensee of that station, and identification is by unit number under a common amateur call.

<sup>1</sup> In this discussion we shall use the term "community" to refer to any local area (not state) covered by a single civil defense instrumentality. It might be a town, city, borough, county or group of counties.

This system of authorization also has the following disadvantages: (1) The licensee would bear the legal responsibility for operation of all station units. (2) If for any reason his license was revoked, or he simply withdrew, the community would find itself completely without legal RACES station identification. (3) Each participating amateur would be required to subjugate his amateur identity — a disadvantage from the morale standpoint.

How best to seek RACES station authorizations is a matter entirely within the discretion of the radio officer. Between the two extremes mentioned above are many middle courses. For example, station authorizations may be obtained for a selected few amateurs (but not all available) and each one assigned a certain number of operators to operate whatever subunits are available. Or it can be left on a voluntary basis, each participating amateur being invited but not urged to apply for station authorization. Still another way is to have all amateurs (Conditional Class and higher) apply for station authorization, then assigning to each a certain number of non-amateurs (as or if required) to work with him toward operation of his station in RACES, and/or any subunits of his station; or the amateur could pick his own non-amateur personnel.

In planning use of non-amateur personnel, let's have one thing understood; they do not operate *anything anytime*, except as a part of a specific drill or test promulgated by their RACES Radio Officer. Usually they will be required to follow a strict operating procedure, and always they are forbidden to touch the transmitting equipment (other than to turn it off and on). So far as RACES is concerned, this applies to Novice amateur licensees as well, and except for the restriction on adjusting the equipment, to Technician amateurs. During peacetime, the only difference between regular amateur operation and RACES operation is that in the latter certain non-amateur personnel may operate RACES equipment under the above restrictions. During wartime (or any other intensification of the present national emergency which causes FCC to silence casual amateur operation) RACES will be the *only* amateur radio.

### Operator Authorizations

FCC will issue no operator authorizations or licenses specifically for this service. Existing operator licenses of certain types will be considered sufficient authorization to operate in RACES *provided* they are supplemented by a certification of the local civil defense director indicating that the holder has satisfied the requirements outlined in the RACES regulations [12.241 (a)].

As mentioned heretofore, there will probably not be enough amateurs fully to implement RACES in most communities. As in WERS, a new source of operators must be tapped. Undoubtedly, those RACES groups which suffer from operator shortage will want to train the required personnel in the shortest possible time.

(Continued on page 140)

# Simulated Emergency Test—1952

*Sixth Annual Test Shows Progress from Past Years—Civil Defense Is Again the Theme*

BY GEORGE HART,\* WINJM

**D**URING the month of October, 1952, 253 ARRL Emergency Coördinators are known to have put on some kind of Simulated Emergency Test of their local Amateur Radio Emergency Corps facilities and personnel. Some reported by mail, some by radio, some both ways. We know that there were many more groups active who did not report either way; perhaps 500 in all. This is still only a third of the total number of ECs, but each year we show a little progress; and today, with the emphasis on civil defense, we have to show a lot of progress.

That the character of most tests revolved about civil defense is evidenced from the fact that of the 206 ECs who sent in mail reports, 107 of them indicated that operation was conducted partly or entirely on RACES frequencies, and many of those who stayed off the RACES frequencies to avoid QRM nevertheless were simulating an emergency brought about by enemy attack. Along with the reports came dozens of questions concerning getting set up for RACES, some of them thought-provoking, most of them answerable by close study of the RACES regulations.

As usual, publicity was favorable and there was lots of it. Most reports had newspaper clippings attached to them ranging from small items tucked away in the back pages to a two- or three-column front page spread. Most ECs have found inviting the press to the demonstration one of the best ways of exciting public interest and creating an awareness that amateur radio is really doing something of public benefit.

The turnover of SET reports from one year to the next remains high. Of the 206 mail reports, 85 also reported last year. This leaves 121 "newcomers," although some of them have reported in previous years. Of the 85 "repeaters," 50 bettered last year's scores and 32 fell behind. The total number of points accumulated nationally exceeded by considerable last year's total, although based on fewer reports this year.

\* National Emergency Coördinator, ARRL.

The following figures are actual totals based on the 206 mail reports, with figures in parentheses being the comparable totals for last year (based on 214 reports):

Total mail reports of activity — 206 (214)  
Total participation — 3012 (2757)  
Participation reported by radio — 1106  
Mobiles & portables — 1553 (1305)  
Fixed stations on emergency power — 241 (254)  
Messages from participants to EC — 2021 (1996)  
EC radio reports sent to ARRL — 163 (173)  
EC radio reports received at ARRL — 140  
Total Points — 28,515 (24,114)

If we adjust some of the above figures to the 253 groups we know participated, we come up with what is probably a pretty accurate estimate of 3700 total amateur participation, 1900 mobiles or portables in action and 300 fixed stations on emergency power. Then if we get on our horses and assume that as many who *did* report their activity (either by mail or radio) did *not* report their activity, we make a wild-eyed and hopeful estimate of 7300 amateur participants, 3750 mobiles and portables, and 500 fixed stations on emergency power. If you think this is pretty rough guesswork (and we admit it), you ought to help see to it that your EC reports your SET.

For those of you who do not care for statistical pie, we can summarize the activity by saying that it was an improvement over last year. Not a big improvement, to be sure, but still an improvement, and that's what we are aiming for. Congratulations, gang, on bettering your 1951 SET performance! And now, take a look at the points tabulation which follows to see if your town, city, county or area is represented.

Allen Co., Ind. (W9BOG).....	206
Amesbury, Mass. (W1ICU).....	24
Andromedon Co., Me. (W1SEJ).....	141
Arlington, Mass. (W1BAQ)*.....	126
Atchison, Doniphan, Brown Co., Kans. (W9IWS).....	64
Atlantic City, N. J., & vic. (W2CYI).....	92
Augusta, Ga. (W4AAY).....	78
Bakersfield & E. Kern Co., Calif. (W6EHN).....	77
Bangor, Me. (W1OLQ).....	134
Belleville, N. J. (W2JYW).....	68



The Mayor of Jackson, Tenn., speaks to AREC members through the microphone of W4RKN/M, thus illustrating an important use of mobiles — the ability to transmit "command" instructions to a large group of people simultaneously while on the scene of or engaged actively in an emergency operation.

**QST for**

Benton & Franklin Co., Wash. (W7OHS).....	176	Howard-Martin Co., Big Spring, Texas (W5AW).....	60
Bergen Co., N. J. (W2CVF).....	818	Hughes Co., Okla. (W5ADC).....	24
Berrien Co., Mich. (W8FGB).....	72	Imbelle Co., Mich. (W8YNG).....	39
Bibb Co., Ga. (W4LXE).....	112	Jackson, Tenn. (W4GEH)*.....	174
Billings, Mont. (W7SAW).....	171	Jackson Co., Minn. (W5LBY).....	97
Black Hawk Co., Iowa (W8TWB).....	170	Jay Co., Ind. (W6OAC).....	35
Bonham, Texas (W5RJM).....	44	Jersey City, N. Y. (W2NGX).....	130
Boonton, N. J. (W2RQI).....	87	Joplin, Mo. (W6FKM).....	41
Boulder City, Nev. (W7LGS).....	126	Kankakee Co., Ill. (W5HLW)*.....	162
Bristol, Tenn. (W4IYI)*.....	112	Kapuskasing, Ont. (VE3AVS)*.....	22
Brookline, Mass. (W1PST).....	121	Kearney, N. J. (W2LSH).....	80
Broome Co., N. Y. (W2PCG).....	110	Kenosha Co., Wis. (W9LRL).....	75
Broward Co., Fla. (W4IM)*.....	206	Kent Co., Mich. (W8FCP)*.....	181
Burke & Jefferson Co., Ga. (W4FD).....	26	Kings Co., Brooklyn, N. Y. (W2BIV)*.....	269
Burlington, Ia., & vic. (W9QVA).....	70	Kingsport, Tenn. (W4CBU)*.....	123
Caledonia Co., Vt. (W1JLZ).....	83	Kittap Co., Wash. (W7HAD)*.....	112
Camden Co., N. J. (W2UCV).....	124	Knox Co., Tenn. (W4HHQ).....	71
Canal Zone (KZ8RM).....	147	Kootenai Co., Idaho (W7FIS)*.....	88
Cassia Co., Idaho (W7HAH).....	23	Lake Co., Ind. (W9KRL).....	228
Cedar Rapids, Ia. (W8HDX).....	164	Lancaster Co., Pa. (W3GJA).....	143
Chambly & LaPrairie Co., Que. (VE2KG).....	115	Lebanon Co., Pa. (W3OTT).....	125
Chester, Conn. (W1AOS).....	1	Litchfield, Conn. (W1ODG).....	72
Chippewa, Mackinaw & Luce Co., Mich. (W8HII).....	63	Long Beach Area, Calif. (W6NSX).....	289
Chittenden Co., Vt. (W1QQN)*.....	126	Los Angeles & Los Angeles Co., Calif. (W6ONI).....	53
Cincinnati, Ohio (W4NRA).....	145	Luzerne Co., Pa. (W3DUT).....	48
Clark Co., Ga. (W4DND).....	35	Madison Co., Ill. (W9DJG/THB).....	346
Colorado Springs, Colo. (W9TV).....	108	Madison Co., N. Y. (W2RXW).....	43
Columbus & Franklin Co., Ohio (W8APF)*.....	297	Marion Co., Ind. (W9KAS).....	189
Concord-Walnut Creek, Calif. (W6TCU).....	123	Melbourne, Fla. (W4PLZ).....	43
Cook Co., Ill. (W9HPG)*.....	1030	Mercer Co., Pa. (W3CJF).....	65
Crescent Bay Area, Calif. (W6ZFA)*.....	348	Memphis, Tenn. & vic. (W4BAQ)*.....	224
Cumberland Co., Me. (W1ITU)*.....	160	Merrimack Co., N. H. (W1BXU).....	172
Dade Co., Fla. (W4SKC)*.....	184	Miami Co., Ohio (W8THJ).....	79
Dallas Co., Texas (W5LEZ).....	111	Middleboro, Mass. (W1FEC).....	51
Dane Co., Wis. (W9TPS).....	135	Midland Co., Mich. (W8VY).....	119
Danbury, Conn. (W1ADW)*.....	71	Middletown, R. I. (W1TRX).....	72
Daytona Beach, Fla. (W4RWM).....	79	Milwaukee, Wis. (W9RUF).....	408
DeDham, Mass. (W1SH)*.....	90	Minneapolis, Minn. (W9MXC)*.....	299
DeKalb & Fulton Co., Ga. (W4EYQ).....	190	Missoula, Mont. (W7COH)*.....	72
DeLand & W. Volusia Co., Fla. (W4WS).....	54	Monroe, La. (W5MWE).....	54
Delaware Co., N. Y. (W2RZP).....	62	Monroe Co., N. Y. (W2QY).....	172
Delmar, N. Y. (W2GTI).....	1	Monroe Co., Ill. (W9ICF).....	43
Denver, Colo. (W8GQY).....	171	Montreal, Que., NW Section (VE2AFT).....	105
Detroit Metropolitan Area, Mich. (W8WFA)*.....	2243	Montreal, Que., SW Section (VE2XZ).....	100
Dresden & Weakley Co., Tenn. (W4FLW)*.....	50	Morgan & Noble Co., Ohio (W8LG).....	76
Duluth, Minn. (W9HRY)*.....	132	Morgan Co., Ala. (W4BFM).....	23
Dumont, N. J. (W2NCY).....	191	Morgan Co., Ind. (W9DUD).....	80
Eads, Colo. (W9KHQ).....	15	Muskingum Co., Ohio (W8GUZ).....	105
Eau Claire Co., Wis. (W9MUM)*.....	132	Myrtle Creek, Ore. (W7OLU).....	44
East Haddam, Conn. (W18UD).....	22	Nashville-Davidson Co., Tenn. (W4AY)*.....	146
Enfield, Conn. (W1LEP).....	54	Neeah-Menasha, Wis. (W9GY).....	84
Erie Co., Pa. (W3QN)*.....	154	Newburyport, Mass. (W1RZZ).....	59
Eureka Area, Calif. (W6SLX)*.....	116	Newcastle-Henry Co., Ind. (W9MBL).....	60
Fanwood, N. J. (W2NXP).....	29	New Bedford, Mass. (W1AVY).....	73
Fort Walton, Fla. (W4PLE)*.....	132	New Britain, Conn. (W1AYY).....	34
Fort Worth, Texas (W5ARK).....	108	New Port Richey, Fla. (W4EJ)*.....	39
Frederick, Md., & vic. (W3WN).....	27	Newton, Mass. (W1EK).....	77
Genesee Co., N. Y. (W2UVF).....	60	Niagara Co., Lockport, N. Y. (W2ZOC)*.....	181
Great Falls, Mont. (W7DS8).....	43	Norwich, Conn. (W1EB0).....	82
Green Bay, Brown Co., Wis. (W9WLZ)*.....	145	Oak Ridge, Tenn. (W4NDE).....	176
Greene Co., Ill. (W9IFA).....	38	Ogden City & Weber Co., Utah (W7GPN).....	78
Groton, Conn. (W1CUH).....	77		
Groveland, Mass. (W1MRQ).....	39		
Guayama, P. R. (K14CP).....	60		
Guilford, Conn. (W1RMF).....	77		
Hamilton, Ont., & vic. (V33KM).....	130		
Haverhill, Mass. (W18TA).....	57		
Herkimer Co., N. Y. (W2PYC)*.....	55		
Holyoke, Mass. (W1CJL).....	79		

\* Bettered last year's score.

W2GNP operates a local AREC station at the Baldwin office of Civil Defense, Baldwin, L. I., N. Y., during the Simulated Emergency Test.

April 1953



# Fourth 10-Meter WAS Contest Results

**O**PINIONS on 10-meter band conditions for the first two week ends of this past December are completely in accord. The most descriptive (and mildest) comment was from W9JYJ, "Band openings were poor and scattered. . . ." Infrequent openings and erratic conditions cut down considerably on the number of reports received for this fourth annual 28-Mc. activity. The largest number of logs turned in, sectionwise, came from the State of Washington. High scorers, however, represented scattered areas indicating pretty similar operating conditions.

Let's get down to facts! While competition is based on entries *within* an individual section, high interest is generally shown about those entrants making the highest over-all scores. Who worked the most states? W7PUM, Warner Thompson, of Arizona, came up with four more states than in 1951 for a total of 42. Closely following him was W4PJU of Clewiston, Florida, with 40 states worked. Two West Coast entries, W7BGH and W6MLW, tied for third-place honors with 37 states apiece.

High scorer? Leading for the third consecutive year was W7PUM with a total of 14,994 hard-to-get points. W7BGH from the State of Washington placed second with 8584 points. Pointwise, W4PJU placed as third high scorer with 7880 points, and a WAS contest newcomer, W6MLW, was close behind with 7585 points.

How did your score compare with the leaders in the most active call areas? Let's see:

W1TMA.....1440	W6MLW.....7585
W2LOD.....968	W7PUM.....14,994
W3RVM.....3780	W8AJW.....2142
W4PJU.....7880	W9JYJ.....1736
W5OUT.....6195	

## Comments

"Conditions on both week ends were very poor for us W1s. During the entire contest we had two very poor openings that lasted for about 10-15 minutes." — W1AQ. "... Worked over 110 locals. Boy they sure came out and provided the contacts!" — W6BUR. "Too bad that the good short skip was a week late. Could have added about ten more states." — W8PNJ. "Over half

of the stations worked were ground-wave locals, giving a pretty good idea of what band conditions were like." — W6ORD. "... The real low point of the contest was on December 7th when I listened for 30 minutes to California stations discussing the sad fact that the band folded up so soon!" — W9KLR. "... No signals other than local were heard during the whole week end (second). Ten-meter openings so far this winter have been few and far between." — VE2KG. "Youse boids been punchin too mni holes in the ionosphere — it's tired!" — W6VPV [whose log measured approximately three feet].

## SCORES

Scores are grouped by Divisions and Sections. . . . The operator of the station first-listed in each Section is winner for that Section. . . . Listings show score, number of contacts, number of states worked.

### ATLANTIC DIVISION

#### *Eastern Pennsylvania*

W3RVM.....	3780-210-18
W3PQB.....	2780-139-20
W3MQC.....	2032-127-15
W3QOR.....	1360- 80-17
W3OCU.....	935- 85-11

#### *Maryland*

W3EF.....	1442-103-14
W3CVW.....	1155- 77-15
W3O8F.....	318- 33- 9

#### *Southern New Jersey*

W2DMR.....	644- 46-14
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#### *Western Pennsylvania*

W3QN.....	270- 30- 9
W3LXE.....	40- 8- 5

### CENTRAL DIVISION

#### *Illinois*

W9JYJ.....	1736-124-14
W9CCB.....	581- 83- 7
W9NH.....	336- 42- 8

#### *Indiana*

W0KLR.....	910- 65-14
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#### *Wisconsin*

W9VHA.....	200- 40- 5
W9RQM.....	175- 35- 5
W9AQD.....	128- 32- 4

### DELTA DIVISION

#### *Louisiana*

W3PXW.....	1360- 68-20
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#### *Tennessee*

W4VJX.....	2210-130-17
W4WLH.....	1400-100-14

### GREAT LAKES DIVISION

#### *Kentucky*

W4SMU.....	567- 63- 9
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#### *Michigan*

W8RXY.....	1260-105-12
W8KNR.....	371- 53- 7
W8IFO.....	344- 43- 8
W8NOH.....	284- 33- 8

#### *Ohio*

W8AJW.....	2142-126-17
W8PNJ.....	296- 37- 8
W8ZOF.....	200- 35- 8
W8KC.....	168- 24- 7

### HUDSON DIVISION

#### *Eastern New York*

W2LOD.....	968- 88-11
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#### *New York City & Long Island*

W2KZE.....	207- 23- 9
W2EEY.....	12- 6- 2
W2NNB.....	9- 3- 3

#### *Northern New Jersey*

W2DJT.....	275- 25-11
K2BCK.....	30- 6- 5
W2EQS.....	14- 7- 2

### MIDWEST DIVISION

#### *Missouri*

W0MCX.....	24- 8- 3
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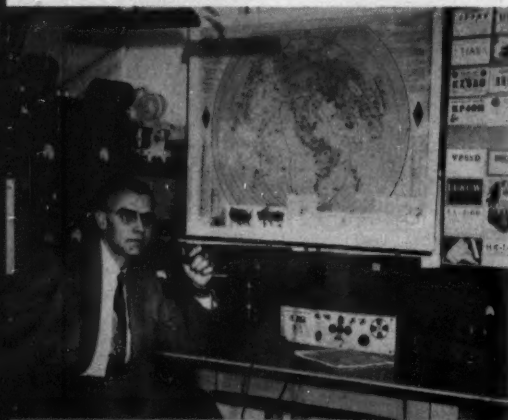
### NEW ENGLAND DIVISION

#### *Connecticut*

W1TMA.....	1440- 90-16
W1AJO.....	350- 35-10

Meet John Stephens, W3RVM, leading both the Eastern Pennsylvania section and the W3 call area entrants with 3780 points.

**QST for**



W1UFW..... 176-44-4  
W1UCA/1..... 56-25-2

#### Eastern Massachusetts

W1VPR..... 364-91-4  
W1ONV..... 345-115-3  
W1PLJ..... 46-46-1

#### New Hampshire

W1AOQ..... 1012-92-11

#### Rhode Island

W1GBQ..... 1417-100-13

### NORTHWESTERN DIVISION

#### Idaho

W7PCZ..... 1650-62-25

#### Oregon

W7OVA..... 3836-137-28

#### Washington

W7BGH..... 8584-232-37  
W7GWD..... 5445-165-32  
W7NLI..... 3168-132-24  
W7PHG..... 2448-102-24  
W7PQH..... 1540-70-22  
W7JVF..... 105-21-5  
W1SIC/7..... 22-11-2

### PACIFIC DIVISION

#### Nevada

W7KIO..... 5814-171-34

#### East Bay

W6EFD..... 4104-171-24

#### San Francisco

W6BUR..... 6420-214-30

#### San Joaquin Valley

W6VPV..... 5880-168-35  
W6NCL..... 5145-147-35

### ROANOKE DIVISION

#### North Carolina

W4KE..... 30-6-5

#### South Carolina

W4UUB..... 297-33-9

#### Virginia

W4RQK..... 1032-86-12  
W4UHG..... 484-44-11

### SOUTHEASTERN DIVISION

#### Eastern Florida

W4PTU..... 7880-197-40  
W4TFP..... 5880-210-28  
W4TRA..... 2150-86-25  
W4RRK..... 1206-67-19  
W4DRK..... 80-16-5

#### Georgia

W4SCU..... 4450-178-25

#### West Indies

KV4AZ..... 322-23-14

### SOUTHWESTERN DIVISION

#### Los Angeles

W6CZL..... 4061-131-31  
W6AEO..... 3068-98-31  
W6NSV..... 2033-107-19  
W6NJU..... 600-75-8  
W6LYG..... 3-2-1

#### Arizona

W7PUM..... 14,994-357-42  
W7ENA..... 741-39-19

#### San Diego

W6MLW..... 7585-205-37  
W6EYF..... 3596-116-31  
W6ORD..... 3224-124-26

### WEST GULF DIVISION

#### Northern Texas

W5SUD..... 3198-150-22  
W5SFW..... 1335-60-15  
W5QF..... 330-30-11



W6MLW, San Diego Section and California high scorer, relaxing from the strains of the WAS Contest while operating mobile. Home-station transmitter used during the contest ran about 150 watts input.

#### Southern Texas

W5OUT..... 6195-177-35  
W5PRO..... 4890-163-30  
W5QXZ..... 3060-120-33  
W5UBN..... 1330-75-18

#### New Mexico

W5NXX..... 3302-137-30

### CANADA

#### Quebec

VE2KQ..... 138-23-6

Errors in scoring consisted, for the most part, of claiming credit for both Maryland and Washington, D. C., as state multipliers and failing to interpret contest rule No. 1, which declares as eligible *only* those amateurs in the sections comprising the field organization of the League. This would eliminate DX and maritime-mobile stations in scoring. (U. S. possessions in the Pacific are counted as the Pacific Division, however.)

<sup>1</sup> Hingham Amateur Radio Club, 4 operators.

## Strays

If your city is named Aberdeen — there are several in the U. S. — you may be in line for an honorary membership in the Aberdeen Amateur Radio Society. This goes along with a certificate the society is awarding to any amateur who contacts four or more A.A.R.S. member stations in 1953, marking the coronation of Queen Elizabeth this year.

### TVI LECTURE

At 8:00 P.M. on Friday, May 1st, Phil Rand, W1DBM, ARRL Technical Consultant, assisted by Lewis G. McCoy, W1ICP, of ARRL's technical staff, will give another in his series of talks on TVI problems. This special meeting, to be held under the auspices of the Amateur Transmitters' Association of Western Pennsylvania, will take place in the auditorium of the Allegheny High School on Sherman Avenue, North Side, Pittsburgh. Amateurs, radio and television servicemen and their friends are invited.

### Silent Keys

It is with deep regret that we record the passing of these amateurs:

W1FRP, Everett H. Gray, Westport, Mass.  
W2CCO, Joseph Bush, Irvington, N. J.  
W2HDK, Clifford E. Friend, Elmhurst, L. I., N. Y.  
W3GQS, Charles B. Ware, Langhorne, Penna.  
W5MR, Robert L. Rolfe, Dallas, Texas  
W58YD, Robert G. Hoover, Lawton, Okla.  
W5UAA, W. Lynn Wilson, Little Rock, Ark.  
W5UK, Charles A. Freitag, New Orleans, La.  
W6BYK, Wilbert V. Falck, Sacramento, Calif.  
W6GON, Hugh E. Green, Baldwin Park, Calif.  
W7PQA, Noel J. Halliday, Provo, Utah  
W7TRUQ, Elsa O. Derthick, Maupin, Ore.  
W8AHN, N. Quinn Warnock, Portsmouth, Ohio  
W8RJG, James K. Keathley, Huntington, W. Va.  
W8SLO, Elmer J. Byard, Cincinnati, Ohio  
W9MUC, Charles Weber, Park Ridge, Ill.  
W9NMY, Edmund Z. Vitkauskas, Collinsville, Ill.  
W9ANZ, Louis F. Leuck, Lincoln, Nebr.  
VE3QS, Percy C. Organ, Toronto, Ontario  
VE4AM, A. W. Morley, St. Vital, Manitoba

**U. S. N. R.****M. A. R. S.**

### **Amateur-Naval Reserve Cooperation**

The Lancaster Radio Transmitting Society holds monthly meetings at the Naval Reserve Training Center, Lancaster, Penna. In cooperation with the Naval Reserve, the society also holds weekly emergency communications drills at the center. The call K3NRL is used with fixed, portable and mobile equipment available to the society during drills. The equipment is also available for use in the event of local disaster. The society plans to conduct classes for prospective amateurs at the training center under the supervision of W3KKG. Members are W3s GJA KKG OY PTD and 8N1.

### **Naval Reserve Liaison**

The District Reserve Electronics Program Officer, Sixth Naval District, and the ARRL's South Carolina Section Communications Manager have worked out a program of providing assistance to local amateurs in eliminating harmonic radiation. In several instances the second harmonics of local Novice stations have been logged on 7455 kc. by the local Reserve Master Control Station. When this occurs, the calls of the stations concerned are forwarded to the SCM. The latter notifies the amateurs and offers assistance in eliminating the harmonic radiation. In cases where a Reserve electronics unit is near by, the amateurs are invited to visit the unit and request technical assistance.

### **Here and There**

K5NRZ, the Naval Reserve Electronics Facility at Shawnee, Okla., conducts a weekly radio class for prospective amateurs. The class is held on Saturdays under the supervision of W5HQ, C. I. Cunningham, ETC, USNR.

K6NAK, Naval Reserve Electronics Facility, Chico, Calif., is the meeting place for Electronics Division 12-10. W6GUV, Lt. W. E. Roberts, USNR, is commanding officer. Other amateurs associated with the unit include W6MWR, Fred Will, Jr., ET2, USNR, and W6JRY, Jerry Fuller, SN, USNR. Two other members of the unit have applied for Novice Class licenses and several more are working toward this goal.

The following amateurs were present at a conference of Naval Reserve electronics program officers in Washington, D. C., January 13-16, 1953: W1NK W2BBH W3QAF W3TDH W4CE W4LW W4RPI W4YEV W5HNW W5PLQ W6BOM W6BVY K6DL and K6DY.



Naval Reservists receive training in both automatic and manual communications. Lawrence J. Grant, RM1, USNR, is shown transmitting a message using radio-teletype equipment at the Twelfth Naval District Reserve Master Control Radio Station, K6USN, Treasure Island, California.

A Military Affiliate Radio System advisory group has been formed to coordinate activities of the MARS in planning possible assistance for civil defense forces.

The six-man group consists of Major Robert A. Wood, Office of the Secretary of Defense, chairman; Major James A. Long (W3UWI), chief, MARS (Army); Captain Walter S. Browne, jr., chief, MARS (Air Force); Mr. C. P. Horne, Federal Civil Defense Administration; Mr. George K. Rollins (W3GA), Federal Communications Commission; and Mr. F. E. Handy (W1BDI), the American Radio Relay League.

The first objective of the group is to make a thorough study of MARS capabilities as they relate to other radio facilities which may be available to civil defense forces — principally the Radio Amateur Civil Emergency Service (RACES). Based on this study, plans will be coordinated to insure that there is no duplication of effort and to make certain that assistance by MARS-trained operators, using military frequencies, is furnished and furnished only when adequate facilities are not available to civil defense forces from other sources. Facts about MARS:

#### **What It Is —**

The Military Affiliate Radio System is an organization of and for United States licensed radio amateurs who are interested in military communications. The system exists primarily for training and to provide in-place facilities which will be available to the Armed Forces in the event of communications emergency.

#### **Who Can Join —**

MARS membership is open to members of the Armed Services or any of the reserve components who possess valid amateur radio operator licenses. Civilian amateurs may join if they are 21 years of age, possess a licensed amateur radio station and agree to operate in accordance with prescribed MARS rules.

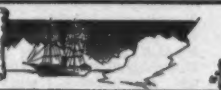
#### **How It Operates —**

MARS is organized to follow existing channels of command within the Army and the Air Force. A MARS Advisory Committee, consisting of representatives of the Armed Forces, other governmental agencies and civilians, meets quarterly to discuss MARS-amateur relations and to advise the Chief Signal Officer and the Director of Communications on policy.

The system is organized into training, traffic and emergency nets according to local requirements. Military frequencies and call signs are provided for that purpose. Operating instructions and training aids are furnished MARS members to improve their techniques and foster study of military radio operations.



# How's DX?



CONDUCTED BY ROD NEWKIRK,\* W1VMW

## How:

February's W6SRY article on the Ultimate Key really set Jeeves a-mulling — he's worn out a dozen pencils already. Really, the potentialities of the keying gadgets he's dreaming up are too numerous (and almost too frightening) to list.

Let's take a peek at just a random few. You'll agree that it requires no great stretch of the imagination to dig the merit in these models:

**The U.O.I. Key.** Automatically checks log for back QSOs, goes after an AC5 or VQ9 sans prompting to send WHERE'S MY QSL? I WORKED YOU YESTERDAY.

**The Okedokey.** Instinctively gives out with OK ON THIS and OK ON THAT after commencing with RRRR.

**The QSZz\$ Key.** Sends everything three or four times whenever anyone dares give you a readability report of R4.

**The Whickey.** Don't be distressed if you "ain't got that swing." This job takes tedious tape-fast input and gives out with good old Lake Erie.

**The Lyncher.** Just the thing for DXers who hunt the stuff pack-style, overpowering unsuspecting rare ones through sheer force of numbers. Its circuit is rigged up to (1) memorize blank spaces on other guys' Countries Lists; (2) dial their numbers on the landline; and (3) spontaneously apply results obtained in Steps 1 and 2 by sending PSE LISSEN FOR MY BUDDIES — AND — CUZ THEY NEED TANNU TUVU TOO

Anyone for chassis chess?

## What:

'Phone hit the high end of Forty in the fashion of a well-attended bargain sale in Macy's basement. "A goodly crowd was there . . ." After a few days of the Donnybrook someone suggested that a new ARRL certificate award be installed for 7-Mc. 'phone: WaS (Worked a Station). A better one might be HAH (Heard All Heterodynes)! More seriously, though, it's already quite an A3 DX band, filling in the abyssal jump between 20 and 75 meters . . . After tuning up for 40 'phone, W9BAE raised the first station he called — CT1BS. Harold then worked CT1QF, VP9BDA and a W or two. CT1CL and KG4AF were heard. W9BAE used 200 watts and a 150-foot length of wire . . . Seven-Mc. 'phones PJ2AA, KH6s MG PM, KV4BB, VKs 2APX 3ACN 3ATN 3HG 3UA, VPs 4LD 6SD, XE1DZ, ZLs 1BY 1HY 1IX 1MQ 2AAW 2AJD 2APV 2BE 2IC 2JA 2KX 2LU 2RA 3JA 3JD 3KA and 4DC were copied by Geo. Chatfield, scouting the new band at Wolcott, N. Y. The frequencies of these stations were all between 7080 and 7200 kc. . . . CT18Q, CO2TN and DI4AP were also patronizing the W/VE crowd. European broadcast juggernauts and their attendant jammers foul up a considerable number of kc. on forty meters but we'll make the best of it, anyway.

Forty c.w. is still around, too. W0FBI captured HK5CR (7008), KB6AY (7014), KL7RB (7028), PY6FI (7025), VP6AG (7010), YV5DE (7009) and over a dozen VK/ZLs. David alternates between inputs of 30 and 300 watts . . . W8JGU, 14 years young, is up to 30 countries after hooking CT1PM (7018), KH6WW (7088), VP4LZ (7020), ZL2MM (7005) and ZS5FY (7035) . . . At W1BTQ we find CT1JS, KV4AA, LU4ZI, OK3BF, VKs 2APX 4HR 6WT, ZL1ACP and many other assorted Europeans. Turk also was among the fortunates to snag 5A3TU . . . W0HAW scored with CE2BG (7001) and W8IEE

would like some scoop on one J5NNO, "in Japan," worked on 40 . . . W5WBU's 10-watt 6L6 snagged CO8AQ and K2CW made off with YU6ATU (7030) and 5A3TR . . . VK2ADE was W6ZZ's 200th Australian station. Miles also cornered PY6DU, W5QDF/KG6 and other Oceanians . . . W4UJJ at Alabama Poly was put through its 7-Mc. paces by W5ONL & Co. with this result: CNSAF, CRTLW, LU9AAW, HC1AR, KV1AQ, YU 1BEF 2DU, VP8AP and ZS9I . . . W2IFF reached 39 countries on forty, assisted by FF8AG, FP8AP, ZL2ACV, ZS6FX, PJ2CB, other Europeans and South Americans. A VFO and 200 watts keep 'em coming back to Dave . . . DL4JN has been hearing ODSAD (7022), CR5AF (7031) and VQ3BU (7030) while W4ZAE catches guys like DU1ER (7014), KAZAD (7020) and TA3AA (7010). Mick finds a 120-watt rig and a 33-foot whip a good combination for DX on 7 Mc. . . . Another quarter-wave-vertical adherent is W9NN. Bob recently tabulated CR9AD, FF8AJ, PJ2AA, LU 1EP 3GJ 6GI 6FAD, PYs 1BBQ 3ADD, VP7NV, ZE2JS, ZSs 3K 9I and scads of ZL/ZS QSOs. His skyhook is designed primarily for 14 Mc. but he sees no reason to erect a "7-Mc. antenna." Neither do we! . . . W1WIQ specifies MB9CA (7010) and W2DEC recommends SV0WB (7024) . . . The West Gulf DX Club DX Bulletin bespeaks of CRTLW, KG6AEJ (7020), KJ6AX (7035), LU9ZDV (7005), MP4BAU, VK9GM (7012), VPs 4LZ (7010), 5BH (7005), 8AJ, VQ3KIF (7003), W6INQ/KM6 (7033) and 5A3TR (7030) . . . DU 1CV (7023), TSV (7037) and VS6CM (7033) are listed in the Northern California DX Club's DX'er.

W6ZZ collected his 30th country on Fifteen c.w. and won his long battle for Europe and WAC. He has a nice 21-Mc. rotary cooking now which pinned down CE3AX, CP1BX, F8AT, FA9RZ, G5JU, KB6AY, KG4AF, KL7AMA, KP4QR, KV4AA, KZ5IF, LU 2DAW 5AQ, OA4N, PY1ADA, VKs 3EG 4FJ, VPs 4LZ 6SD, XE18A, ZL 1AH 2GS 3IA and Y810. W6ZZ has 44 of 45 states worked on 15 meters confirmed . . . As this column begins to get around W/Ks will be able to put 'phone to work on the 21-Mc. band and this development should live things up there a-plenty.

One-Sixty is dying hard. The 1.8-Mc. situation got so lively this season that some of the boys switched to 'phone.

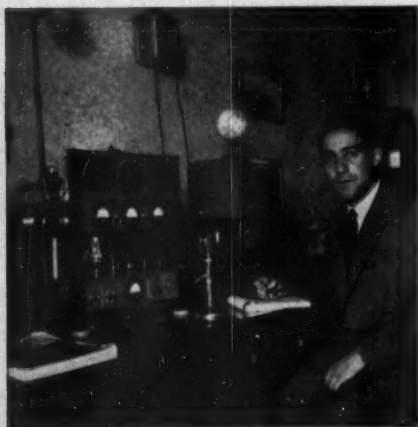


\* DX Editor, QST.

W3EIS had a 2-way A3 QSO with G5JU and W4NTZ did likewise with VP9BDA. Don at W3EIS also telegraphed with Gs 3GGN 3GZK 3US 5JU 5RI 6BQ 6GM 8JR and KV4AA. Z83K, ZL1AH and OH3NY reported hearing Don's signals on 160. .... W1BB chalked up Gs 3GZK 3PU 5JU 6GM and EI9J. Stew lists these stations as participants in recent one-sixty doings: W1e AHX AYG BB LMU LYV RQR, W2s EQS HCW MX PP WC WWP, W3s EIS TBG, W4TSM, W6s DBI KIP, W8s BKH EOR GDQ PMO, W9s BQQ LRH NH PNE, W9NWX, K2ANR, VE1s 1EA 1YW and 2AIE. .... W4BRB left 80 meters for a while and worked EI9J (1790), Gs 3PU (1790), 5JU (1788), KV4AA (1823) and VP4LZ (1810). .... W9PNE got across to Gs 5JU and 6GM. He was heard by ZL1AH and so were W1BB, W1EFN and W9NWX. .... HB9HI and DL2RO were reported active on the other side of the pond but we have no reports of their getting across to the States. Z83K was rumored getting set with a 10-watter. All in all, it's been quite a season for old 160!

*Seventy-Five 'phone* has been stealing the show at times. TA3AA (3780) worked W1ATE and has heard just about every W/K call area on the band. Andy is gunning for the boys around 0300 daily, according to W1VG. .... W2ESO chatted with CT1BS, EA2CQ and G2PU while W3EIS found the same EA2, VP6SD and VP9BDA available. .... Listener A. L. Caldwell, Brockton, Mass., overheard HR1s BG (3785), SO (3785), CO2FN (3790), HB9s FU (3790), MS (3785) and HP3FL (3790) doing fine business. .... The WGDXC gang add CN6FR (3785), EL2P (3751), ZL1WW (3795) and Z5GBW (3793) to the team.

On *Eighty c.w.* W6ZAT put the bite on CE3AX, DU6s IV RG, EA9AP, EL2P, FF8AG, G15UR, LU4ZI, PA0XYZ, VK1RG, V86CG, VU2AT, YN1AA, ZE3JP and Z89I. No, this isn't 20 meters — we said 80! Del says W6DFY landed VQ3KIF on the band and that VKs 2GW 5JE and 5KO are consistently on the lookout for a VU4CN but was a little doubtful about him. .... LU4ZI (3509) and ZE3JP (3510) came back to KH6ARA; W6EJA snapped up ZK2AA one evening. .... W4BRB and W2QHH are well over 100 countries worked on 3.5 Mc. now (Gene has the cards to prove it!) and both knocked off ZK2AA for their numbers 106 and 102 respectively. Gene lately added LU4ZI, Z59I (3507), VQ3KIF (3512), EL2P (3524) and FF8AG (3505) in that order. .... W4KFC fired up and shortly found himself embroiled in an interesting 4-way QSO with G4VF, LU1EP and ZL1CI. Two more customers would have made it a WAC roundtable! .... W8YGR and VE1JD collared VP4LZ (3510) for South America. Lis also mentions working GD3UB, FF8AG, KH6ARA, SF3PL, ZL1HM and over a dozen assorted Europeans



One of the more potent 'phone signals out of Europe these days is that of CT1CL. Eugenio has over 150 'phone countries to his DXCC credit.



LZ2AX manipulates the key at LZ1KAB. Vasco also operates Bulgarian club station LZ1SKA. (Photo via WINWO and 9S4AX)

.... W1ORP wasn't able to flag down ZK2AA but he did click with CN8EG, FA8BG, FA9RW, FF8AG, KH6ARA, VP8AP and 5A3TU. .... W1BTQ was scaring up his share of Europeans and W6ZZ was on the spot for KL7APH and ZL4IE.

W2TXB stuck with his n.f.m. on *Twenty 'phone* to the tune of CR6BX, EA9AI (14,150), EL2P (140), KT1LU, OQ9DZ (180) in Ruanda Urundi, TF5SV (160), VQs 3BU (100), 4NZK (180), 4RF, ZD4BK and ZS3N (170). .... CS3AC (348) at 1743 EST, HI6TC (259) 0655, HRIKS (196) 1730 and YN4CB (185) 1720 answered W2DEC. .... Three-hundred watts and a 2-element array helped W9BDW to 'phones (times CST) CN8s EJ 0840, FI 1259, CT1s BS 1612, CL 1640, CX2CO (295-305) 0710, EL9A 1409, KA2IM (290) 1825, KG4AU 1819, OE13USA (350) 1145, OQ5EB (140) 1350, OX3BD 1025, VP3LF (180) 1740, YS1MS 1740, ZL2ACT (220) 2250 and ZP5CF (220) 1732. .... W1MCW is keeping her fingers crossed on IIAHR/9A2 (170) whose English was quite limited.

.... W1WIQ was without a rig but Norm checked receiving conditions on 14-Mc. 'phone and encountered CR6AI (150), EL2P, FA8BG (179), HB3FL (183 n.f.m.), KV4BB (207), MJ3US (140), MP4KAC (131), PI1J (169), PJ2s AA (150), AK (115), CA (107), OF (132), TA2 ZFA (140), JAA (190-303), VP2s 2AF (140), 2GH (122), 3HAG (137), VQ2DT (131), ZD4AB (134), ZS3S (115), 5As ITC (197), 3TY (194) and I1YAK (340) of Trieste. W1WIQ spots lots of VK boys coming through on the long path of an afternoon. .... A. L. Caldwell informs us of the activities of CS3AB (195), EL2R (340), HR1s FV (330), SO (120), OE1JGR (185), OQ5BZ (130), ZS3X (125) and 5A3TZ (340), all putting fine sigs into Brockton, Mass. .... WGDXC's *DX Bulletin* has these 20-meter 'phones worked, heard or heard worked and called: AP2L (184), CRs 6AC (177), 6AG (112-142), 6AJ (125), 8NMC (117), FQ8s AK (160), AR (160), HC8GI (138), HZ1s AB (159), TA (129), IIAHR/M1 (120), M13s LK (197), LV (137), ODSAB (132), OQ5BG (149), OY2Z (112), SP9KKA (114), SUCBE (112-135), TF5SV (157), VP4s 4TI (178), 1SJC (180), 5BF (147), VQ5AU (140), YI2AM (111), ZD4BL (125), ZE2s JK (121), KQ (191), ZS9G (199), 3V8s AS (203), BB (151), 4X4s BA (124) and CW (176).

*Twenty c.w.* we take up last this month but by no means least. W9IHN carbonized his Lazy-H insulators on CN8FL (14,009), CT1TY/446 (030), FF8AG (030), FQ8s AG (030), AS (050), GD3UB (020), OY3HRS (050), TAJAA (020), TF3MB (035), ZB1BR (040), ZE5JA (095), Z53T (025), 5A3s TC (050) and TZ (055). .... CX4CZ (014), an FFS, VP4s 1AA (005), 3VN (080), 4LZ (020), 6GT (007) and ZB1AH (037) enraptured W8DLZ. .... W8JGU liked CN8EY (035), CN8MI (040), KV4AQ (060) and V8MCM while W2DEC was occupied with EA9AP (005) at 1117 EST, SP9KKA (078) 0815 and YS1VJ (001) 1755. .... W4ZAE's half-wave vertical accounted for one CE6AA (002), VS1RR (034) a bit too loud, and VU2CC (023). .... Heard but not worked at W1WIQ: CP5EK (025-057), EA8AX (082 48), FQ8AS (102 46), JA1AD (009), LU3ZO (055) on Deception Isle, TF3s AB (025),

### First U.S.A.-Asia QSO on 160!

On March 8th W1BB, Winthrop, Mass., worked ZC4XP, Nicosia, Cyprus, for the first U.S.A.-Asia 160-meter QSO on record. VE1EA worked ZC4XP the previous week end for VE1EA's second 160-meter Asia QSO. As will be recalled, VE1EA worked HZ1KE on January 14th, 1951, for the first North America-Asia 160-meter QSO.

NA (015), VP8AP (011) and numerous YUs..... W2TXB swapped code with CRs 6CZ (030), 7CN, EA9BD, FQ8AR, OQ5CP, VQ2DX, VQ4NZK (090) and ZE5JL..... LZ2KSK (075), MD5RS (080), SV6WE (098), VSs 1FE (075), 2DF (061) and ZD2HAH (065) replied to DL4JN; Bill is still pursuing AP4A (018), F9AE/FB (075), ISGO (060), JA1AA (020), OD5s AB (020), AI (060), BH (050), OY2AZ (085), VK1JC (080), VS2DU (070), ZDs 2FFB (080), 9AA (050), 3V8AV (010) and one peculiar 5S5EE (082). [Sounds like Gene Krupa with a bug, Boss, —James.]..... W4TVQ would like a boom lowered on phoney XZ2FT. Art grabbed FD8BQ (071) and has fresh QSLs from GD3UB, PJ2AD and 3A2AV..... W1RST also ran into the demented character signing XZ2FT and W4LQC happened upon CE3DZ (042), CP1BX (050) and a VP6..... W6NJU notes that Japan's KA boys have been putting steady signals into the West Coast around 1600 PST. Gary hooked KA2s GU and ZZ..... Among the trophies of VE3AVS we see FP8AP, KA9AA, OX3s HK UD, TF3SG and VP6EB; W2LYO got the same TF3 and VP6 as well as an FF8, OE13RN, VP6UN, YU1DF and a 5A3..... W2ZGG needs only the VP2 and VP3 call areas for "WAVP" — KA9IJ (080) and SP2KGA were approached successfully by W2PZM..... HH2FL was country number 58 for W2TEG and W9MQK did well with EA8BC, FF8AT, GD3UB, PILLS, TA3AA, VQ4CW and ZB2A..... Only six to go for the century mark at W8YGR after YU3BC (020)..... The WGDXC DX Bulletin (W5s KUC and UCQ) stresses the availability of those in this c.w. glossary: CR7s AF (045), AK (018), IZ (052), CT2BO (030), EA9AP (070), EL2P (054), FF8s AH (020), AJ (078-100), GP (010), FM7WD (112), FR7ZA (028), GC2CNC (050), HH3L (046), HR2HZ (030), KA2HQ (012), KF3AA (060), WSQDF/KG6 (059), MF2AG (078), PJ2CH (073), VP8As O (028), R (060), S (058), T (021), U (065), VQs 2DS (012), 2GW (024), 3BU (020), 3KIP (075), 4HJP (020), 5CL (050), ZD2S (072), ZE4JX (078), ZS7s C (045) and D (010) in the p.m.; EA9AX (083), FB8ZZ (050), FQ6AL (080-100), M13LK (012), MP4BBD (048), OD5AD (055), OYZZ (050), TF5SV (010-055), SP6KKA (020), VP8AK (015), VQ3BM (042), ZB1BU (005), ZC4IP (005), ZD9AA (033) and ZS3U (018) in the a.m.

### Where:

Haiti's QSL bureau has had a change of address, according to W2DEC. It's now Radio Club of Haiti, P. O. Box 943, Port-au-Prince..... OD5s AH and AK inform us via W1RWS that Lebanon amateurs have formed the *Association des Radio-Amateurs Libanais*. We presume that QSLs addressed in care of this society, B. P. 1202, Beyrouth, Lebanon, will be relayed to any OD5s. Authorities there have now issued call letters from OD5AA through OD5AR — Lebanon's amateur radio boom is really on.

CN2AN, S. P. Fronkauer, ex-PA90A, % RCA, British P. O. Box 57, Tangier, Morocco  
CR6BX, P. O. Box 2163, Luanda, Angola  
DL4YK, SFC E. F. Diehl, jr., 512th Sig. Base Main. Co., Pirmasene Signal Depot, APO 199, % Postmaster, New York, N. Y.  
EA7DT, P. O. Box 313, Malaga, Spain  
EA7EV, (QSL to EA7DT)  
EL2P, Roberts Field, Liberia  
FF8AC, Yves Rangin, SNA, Aeroport de Yoff, Dakar, F.W.A.  
FF8AG, Ivan Pastre, Box 253, Bamako, French Sudan, F.W.A.

On the occasion of a visit by 4X4BX (right), SM5LI (seated) and SM5RM discuss some QST circuits in SM5LI's Stockholm shack.

FF8AI, Jean Maillet, Bloc N2, Appartement N13, 113 Avenue William Fouty, Dakar, F.W.A.  
FF8AT, Box 6020, Dakar, F.W.A.  
FM7WF, (QSL via W6ARI)  
FQ8AT, R. Franchot, Etat-Major Transmissions, Brassaville, F.E.A.  
FY7YX, % Pan-American Airways, Cayenne, French Guiana  
HH2RS, Raymond Scott, P. O. Box 427, Port-au-Prince, Haiti  
HH3FL, Fernand Labelle, Hotel Majestic, P.O. Box 991, Petionville, Haiti  
HR1FV, American Embassy, Tegucigalpa, Honduras  
JA1CU, Karutada Ohira, 2-4817 Asahicho Warabi, Saitama, Japan  
KR6LZ, A. W. Dale, Jr., VP-22, APO 331, % Postmaster, San Francisco, Calif.  
KR6MW, Tony E. Welsel, 8111th AU, APO 331, % Postmaster, San Francisco, Calif.  
KR6PN, Perry W. Esten, % GSW&K, APO 331, % Postmaster, San Francisco, Calif.  
KR8USA, RYCOM MARS, Signal Office, APO 331, % Postmaster, San Francisco, Calif.  
KT1LU, % Air Attache Officer, American Legation, Tangiers  
OD5AO, Raymond Saidah, P. O. Box 161, Beyrouth, Lebanon  
OQ9DZ, (QSL to OQ5DZ or OQ5RA)  
ex-VE8RY, John W. Smith, VE3DCQ, RR 1, Billings Bridge, Ont.  
VP3VN, 9 Howes Street, Georgetown, British Guiana  
VQ4NZK, % U. S. Consul, Nairobi, Kenya (or via W1PLJ)  
ex-V86BA, W. A. Musty, 21 Grosvenor Ave., Chatham, Kent, England  
V86JH, (QSL via V86AJ)  
W1JNE/V06, (QSL to W1JNE)  
W5WLM/V06, MARS Director, APO 677, % Postmaster, New York, N. Y.  
YN4CB, P. O. Box 10, Bluefields, Nicaragua  
ZC6UNJ, (QSL via RSGB)  
ZD4BK, P. O. Box 154, Takoradi, Gold Coast  
ZD4BL, (ex-G2ATU) P. O. Box 201, Sekondi, Gold Coast  
ZE5JL, P. O. Box 860, Bulawayo, So. Rhodesia  
ZS3N, P. O. Box 15, Luderitz, Southwest Africa  
ZS3T, Box 263, Tzanebe, Southwest Africa  
ZS6FN, R. Goldblatt, Box 7243, Johannesburg, Union of So. Africa  
5A3TC, (QSL via W8UW)

Instrumental in assembly of the preceding batting order were W1s BTQ RWS VG WPO, W2s DEC TXB VMX/1, W4QCW, W8DLZ, W9s IHN OIN and the WGDXC DX Bulletin.

### Tidbits:

Asia — Of considerable interest from W9KOK: "I've noted you mentioned Reg Fox, AC4YN. Yes, he is safe and as well as can be expected. . . I've been in constant communication with Reg for several years now. Bob Ford, AC4RF, fared much worse and is reported still in prison in Peiping." This bears upon repercussions of the ensnarled

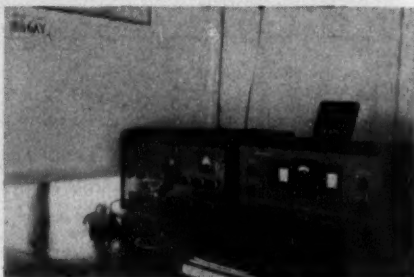


Tibetan political situation . . . . . Ex-MP4KAE, heading back to the United Kingdom and G4IX, gives us some lowdown on Kuwait Hamdom as he left it: MP4KAA now operates ZC4DT to westward; MP4Ks AB and AC are working a lot of 20-meter 'phone; MP4Ks AD AE AF and AH have closed down for other assignments; MP4KAG is now in Brazil; and MP4KAI currently inhabits the 14-Mc. region, 'phone and c.w. Don't forget that MP4KAC has inherited Kuwait's QSL managership. . . . . KA9AA notes that 4UAS QSLs carry no indication of location — not even "India". This omission does not necessarily bar such cards for DXCC credit but the information certainly seems called for on any QSL! . . . . . ZC6UNJ of Jerusalem has this to say: ". . . I have sent a card to every new station I have worked. It might be interesting for Ws to know that we read their mobile twenty-meter 'phones. I listened to a W4 mobile the other day putting in an R5 89 signal here and all he was doing was 'testing'. . . . If he had just cut his carrier and listened on his frequency he would have had ZC6UNJ calling him." And that would have been some pretty good mobile DX! Bill, as you may know, is ex-W8RAU-W9WUI-W5LLQ-KP4EZ. . . . . We have on hand a letter from a would-be amateur in India who desires to enlist the services of an American ham to guide him toward getting on the air. Anyone inclined to tackle this worth-while task on a correspondence basis may write Mr. T. Singh, c/o 22 Medico, Agra, India.

**Afries** — Old-school DXer Ivan Pastre, FF8AG, earned the first French West African DXCC over recorded, finds WIWPO. Ivan previously ran down DXCC as FE8AB. All this and W QSOs, too! . . . . . "Please . . . request W stations to call me a little higher or lower in frequency as my own frequency is always covered with a three-layer pile of European stations calling me continuously for several minutes. This has prevented me . . . solid contacts with the States." So writes CN2AN, proving that our hemisphere has no corner on the boor market. Swapping his PA0 label for a CN2 prefix allows Stefan to raise people like ZL1HY, Y86CG and Y87MC on a single short CQ. CN2AN rolled up 50 countries in his first two weeks on the air and is on 14 Mc. almost daily with a 350-watter. . . . . From July 11th through July 17th NRARS will operate VQ2RCC in conjunction with the Rhodes Centenary Celebration Festival to be held in Nkana-Kitwe. The 40-, 20-, 15- and 10-meter bands will be operated with separate rigs and a special QSL will be sent to each station worked. Amateurs interested in schedules with VQ2RCC are invited to write the Northern Rhodesia Amateur Radio Society, P. O. Box 332, Kitwe. . . . . W0IHN learns that ZS2AG is on the lookout for Idaho — WAS, of course. . . . . If FQ8AP QRTs suddenly during QSOs, don't junk your receivers. He tells W4LHT that Fort Archambault's airport power generator shuts down abruptly and stays off from 1800 to 0400 GCT. . . . . A remark by F8SBB to WIMCW asserts that his returns are mighty, mighty scant from a 100-per-cent outgo to all VE stations worked. . . . . ZS6FN would appreciate an assist on the procurement of tarty W6WVJ/KW6 and KG4AO (W4RLI op.) QSLs now long overdue.

**Oceanic** — ZL1MP and XYL have been visiting Panama and the Canal Zone on the first leg of their jeep jaunt overland through Central America north to the U. S. *Bon message*, folks. . . . . HC8GI visited KZ5-land, too, and was thus QRT for a couple of weeks. . . . . The new VK9YY is former VK2AIR and VK2YC says he likes to QSL. He's not to be confused with the former holder of the call. . . . . From KB6AY on Canton Island: "Band conditions remain very poor on all bands except 40 meters, so there is not much new in the way of DX to report. We are

ready to utilize the new 40-meter 'phone band [as soon as possible]. It may turn up something interesting in the way of DX contacts. Twenty meters has been even worse this month than last — if that is possible. We would like to do a little more work on 15 but there has been so little activity on that band that it is a bit difficult to hear anything out here. On week ends we hear a few Stateside signals and an



KB6AY apportions Canton Island QSOs on 10 through 40 meters with this orderly installation. Fred was formerly active as KM6AH and KM6AH/KB6.

occasional South American." By the way, Fred seems to be on the trail of a new type of DXCC. His oldest son was born in California, his second on Midway Island and his latest offspring just saw his first light of day on Canton Isle. [He'd better settle for WAC, Boss. — *Jesus*.]

**Europe** — The c.w. session of Switzerland's Helvetia-22 Contest, sponsored by USKA, falls on April 18th-19th, beginning at 1300 GCT and ending at 1900. The object for W/VEs is to work as many Swiss cantons (provinces) and Swiss stations as possible. Briefly, each QSO earns 3 points, this QSO-points total to be multiplied by the number of cantons contacted. An HB may be worked but once per band. Watch for "CQ H22" and call signs like HB1KB/NW, the added letters representative of the canton in which a station is located. This reminder via W2DKF — submit results to HB9EU. . . . . W2TXB ran across another Spanish husband-and-wife ham team — EA7EV is EA7DT's XYL. . . . . ON4NC desires a lift to land QSLs from HL1BB ('48), W4BOW/Iwo ('49) and C8KP ('52). . . . . G6TG befriended a wandering W4 in Oslo, Norway, and then lost track of the lad. Les would like to hear from him should he read this. . . . . W7DKT, who posed the Stray on page 47 of last month's QST, tips us off that he is heading for DLA-land as a USAF major.

**South America** — Intriguing tale from LU3BAC: "On January 15th at 1355 Argentina time LU9MA, installed on the summit of Aconcagua, 7035 meters [over 23,000 feet] high, effected a 'phone transmission . . . on the 7-Mc. band with LU stations operating in an encampment in the vicinity of 4600 meters high and San Rafael (Mendoza) around 290 kilometers away. . . . We consider this experience from such a high altitude a first in amateur radio history." If any counterclaims develop we'll be mighty surprised — Aconcagua is this hemisphere's highest peak! The radio gear was handled by a crew of three, weighed four kilos, had a transmitter output of approximately one watt. . . . .

**DX 55 Years Ago in QST** — The Wilkins Arctic Expedition, naKDX, was reported worked by 7ABH on 33.1 meters. . . . 8CFR and sh1B are congratulated for DX traffic assistance given GMD, the Dyott Brazil Expedition. . . . WNP, the *Bowdoin* in Arctic waters, rolled up a February traffic total of 349 message points. . . . Some DX reported worked in early 1928: ai2KT and ai2KW, India; agRIL, Tiflis, Georgia; aq1LM, Iraq; auRAB8, Turkestan; zeplMA, China; and WWD in the Pribiloffs.

At Mile 1235 on the Alaskan Highway you'll find KL7AFR. Bill possesses the only DXCC membership in the Territory. (Photo via KL7AI)

**QST for**





# Hints and Kinks

## For the Experimenter



### SELENIUM-RECTIFIER AUDIO LIMITER

**C**HANGE-OVER relay clicks, extra-loud heterodyne howls, etc., are deadened at the output of the HRO here at WIBDF by an extremely simple limiter consisting of nothing more than a pair of 115-volt 60-ma. selenium rectifiers. The rectifiers are connected in parallel with opposing polarity and this combination is in turn tied across the 500-ohm output terminals of the receiver. The speaker is connected to 8-ohm terminals of the output strip. — *Edgar Seeler, WIBDF*

### USING BLOWN INDUSTRIAL FUSES AS LOADING-COIL FORMS

**B**LOWN industrial fuses that are ordinarily discarded by factories, construction concerns, etc., can be modified for use as mobile antenna loading-coil forms. The fuse best suited for this application is one having a diameter of  $1\frac{3}{4}$  inches, a length of 6 inches and an electrical rating of 600 volts at 150 amperes.

To prepare a fuse for use as a form, it is necessary to remove the end bells so that the lime-dust contents and the copper fuse blades can be discarded. The contact arms must be cut from the end bells and the label should be removed from the tube.

Fig. 1 shows before and after sketches of a modified fuse. Notice that the finished job has a

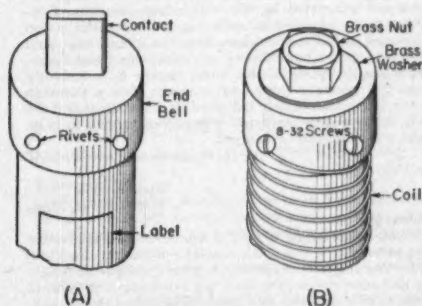


Fig. 1—(A) shows one end of an industrial fuse before modification and (B) shows the same unit adapted for use as a mobile antenna loading coil.

brass nut and a brass washer brazed to each end bell. The brazing operation can usually be handled by a local welder. Naturally, the nuts used should match the threads of the antenna sections. Type 8-32 machine screws are used to tie the end bells and the tube together and also serve as the termination points for the loading winding.

Loading coils of the type just described can be turned for almost negligible cost and, as a result,

it is advisable to prepare a number of fuses at one time. This procedure will save a trip to the welding shop each time that a new form is needed.

— *Kenneth M. Rude, W6TEN*

### FEEDER-SPREADER HINTS

**S**OME newcomers may not be familiar with the established practice of making feeder spreaders. Inexpensive substitutes for the commercial jobs can be made with ordinary  $\frac{3}{8}$ -inch wooden dowels. Cut the dowels into lengths that are 1 inch longer than the spacing of the proposed transmission line and then drill a clearance hole for the wire at each end of each spreader. The holes should be located  $\frac{1}{2}$  inch in from the ends of the rods and should provide a snug fit for the wire. Next, dip the spreaders in hot paraffin and then set them aside to dry.

Dowels can usually be bought at a local hardware outlet for approximately 10 cents per 3-foot length. Thus, it is possible to make spreaders for a 6-inch line at a cost of only a nickel apiece.

— *Jack C. Andrews, W9YWE*

**T**ONI hair curlers that are to be used as feeder spreaders can be held securely in place with fast-drying model airplane cement. Just apply cement on each side (where the wire passes through) and over the ends of the curler and then allow adequate drying time. After the cement has hardened the feeder will break before the tie gives way. — *Ken Cary, W0IXM/2*

### WISE SUBSTITUTE

**O**NE good substitute for a small portable vise when the latter is not available is an ordinary adjustable wrench. Soldering lugs or other miniature components can be clamped in the jaws of the tool and then worked on with two hands after the wrench has been laid flat on a box, table, bench or other handy surface. — *Steve Graham, W9REV*

### SOLDER WHEN YOU NEED IT

**D**ID you ever get ready to start an outdoor soldering job and then find that everything is on hand except the solder? This won't happen again if you make a practice of keeping a few turns of solder wrapped around the handle of the iron.

Incidentally, if the iron is a short-barrel job (gun or low-wattage type) the end of the wrap can be pigtailed out to the tip. If this is done, it is frequently possible to complete a soldering operation that normally calls for a third hand.

— *L. Bennett, KL7LV*



# Correspondence From Members-

The publishers of *QST* assume no responsibility for statements made herein by correspondents.

## DOCKET 10173

P. O. Box 1061  
San Juan 5, P. R.

Editor, *QST*:

The General Class boys sure have my sympathy. Think of it, for twenty odd years they have been deprived of privileges enjoyed by Advanced Class licensees just by decision of the powers that be, who have now reversed their decision.

And what have the General Class boys who stampeded FCC offices to take the Advanced Class examination before Dec. 31, 1952, gained? Just 18 or 20 days 75- and 20-meter phone operation over the General Class boys who will now get those privileges next February, without further examination. . . .

Good-by to the good old days before the nippers cut their amateur eye-teeth on a kilowatt 'phone transmitter before they had been in the hobby long enough to learn proper operating ethics.

— E. W. Mayer, KP4KD

2310 S. 61st Court  
Cicero, Illinois

Editor, *QST*:

. . . The FCC is to be commended for this startling move. It will give hand-on a shot in the arm similar to that given it by the opening of the ham bands to Novices. Ham radio is not a profession; it is a hobby, and as such it should be made available to as many as possible, and not hamstringing with technical requirements far in excess of that needed for minimum ham needs.

Allowing General Class ham operators to work in 'phone bands is no different from allowing Novice in those portions of the ham bands previously restricted to higher class licensees. These new regulations will give many hams a "foot in the door of further ham progress." From there, I am sure, many of them will become just as proficient if not more so, than some of those Extra Class squawkers whose letters appeared in your column. . . .

— William J. Subajda, W9AOD

88 Esso Paterson  
Esso Shipping Co.  
115 Broadway  
New York 6, N. Y.

Editor, *QST*:

. . . If the Commission's purpose was to idealistically equalize operational privileges, then it did so at the expense of lost initiative on the new amateur's part. Further, it attracts rash inexperience that could easily reflect discredit to the amateur fraternity and art.

I am fanatically opposed to catering to special interest with disregard for the majority. Such action is undemocratic and precludes the principle that a mass has the wisdom to govern itself.

— Theodore Pedersen, W2DEB

369 3rd Avenue  
Phoenixville, Penna.

Editor, *QST*:

Your stand on the FCC action to open 20 and 75 to General Class licensees seems rather childish and founded on sentiment rather than fact. The Class A license has simply become a ticket to the privileges it authorizes; it does not signify that the holder is head and shoulders above the General Class peasantry, nor that he is engaged in furthering the cause of amateur radio through his technical competence. His "advanced techniques" often include such things as burning a hole in the 75-meter band with a full kilowatt while engaged in bigoted conversation with someone a few miles away. Is this a step forward? Can he copy code as well as the average Boy Scout? . . .

. . . The Extra Class license can be an achievement for which to strive, without any strings or inducements other than the deep personal satisfaction thus gained. This is as it should be. The old Class A never interested me sufficiently to prompt me to take the exam; now I find myself itching to hang an Extra Class license on the wall. . . .

— Clifford J. Bader, W3NNL

1115 So. Wall St.  
Los Angeles, Calif.

Editor, *QST*:

I have only this comment to make — my amateur Extra Class radio operator license No. AE-11-88-E, so proudly and conspicuously displayed over my operating table, is now relegated to the junkpile.

— George S. Chan, W6GCD

1134 W. State Street  
Milwaukee 3, Wisconsin

Editor, *QST*:

. . . I join in the gnashing of teeth against this incredible and astonishingly inconsistent FCC action. It is difficult to conceive a more desultory approach in the service of the nation than to abolish an equitable incentive system promoting progressive development of knowledge in this nation's greatest electronics and communications manpower reservoir. When one considers that this pool of knowledge is probably the principal justification, from a national standpoint, for supporting the amateur service it is small wonder that certain amateurs have expressed a fear of more sinister intent in the formulation of such a destructive policy as that presented by the FCC. . . .

When the Commission delivers a *coup d'état* to a time-honored system of advancement, based on self-improvement and supported by the well-proven principle of incentive reward for human endeavor; and when this action represents a 100% about-face from the excessively rigid dictum proposed immediately preceding this latest fiasco; and when the effect of this latest vagary is to seriously jeopardize amateur spirit and progress; then a thorough review is most absolutely indicated. It is certain that if the FCC is working in good faith this apparent error in judgment will be quickly re-assayed. . . .

— H. W. Bardenwerper, W9OLW

Puddingbrook  
E. Pembroke, Mass.

Editor, *QST*:

When I subscribed to *QST* I was under the impression that editorially it was a fair-minded publication. I am still under that impression and excuse my oversight by believing that someone on your staff was overdoing it in favor of Class A, or is that the only group of amateurs you favor?

10 to 0 (I spell — ten to nothing) a very poor 8 reading from where I sit.

Even *Life* prints the other side. But *QST* — not one word. It is entirely possible that you had no correspondence favoring the FCC Rulings. This I doubt. However, if this be the case I apologize. . . .

— Emerson Corson, W1TTI

[EDITOR'S NOTE: Apology accepted. As of copy time for February *QST*, we had several dozen letters on the subject, every single one opposed to the Commission action. To date we have received 133 letters; of these, 42 expressed support of the new license privileges and 91 opposed them. Included are letters from 7 clubs and 2 nets, all indicating unanimous opposition by members. The official Docket file, at the time FCC decision was made, showed an even higher proportion of individual opposition.]

## HARMONIC GENERATION

550 So. G St.  
Oxnard, Calif.

Editor, QST:

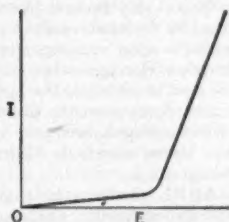
I enjoyed W2RYI's article, Dec. QST, very much. Think his conclusion is last paragraph in error. I believe many hams have suffered from this type of TVI, but could not determine what was the cause. About six months ago I started having TVI on Channel 4 when operating on 20-meter 'phone. This TVI was not constant from day to day or from transmission to transmission. After spending many, many hours on the transmitter and TV receiver I finally came to the conclusion that something else was amiss. To make a long story short I finally replaced my bare wire clothesline with plastic-covered lines and the TVI cleared up. As a matter of interest, the 20-meter antenna was a center-fed doublet about 15 feet from the TV antenna and the clothesline was about 40 feet from the TV antenna. Transmitter power input 100 watts, TV station 60 miles from my QTH.

— W. W. Deane W6RET

West State St.  
W. Lafayette, Ind.

Editor, QST:

Mack Seybold's article on nonlinear conductors and TVI — salt solutions are nonlinear conductors. Below their decomposition potential, salt solutions are poor conductors. Above this potential electrolytic decomposition occurs, enhancing the conductivity of the solution. The following curve illustrates the EI relationship for a salt solution.



The decomposition potential is in the order of 1 volt and depends on the salts in solution. Traces of copper in salt water will markedly lower this break in the curve, giving a smaller linear region.

Mack Seybold's comment on sea-water corrosion and TVI suggests that this may be one of the sources of external harmonic production.

— Volney Wallace, W7SJZ

## "CARE" GIFT SUBSCRIPTION

Zeelestraat 95B  
Eindhoven, Netherlands

Editor, QST:

Received your so welcome letter just a day ago. Thank you so very much for selecting my name as a member of the American Radio Relay League for the period of one year.

I also wrote a letter to the donor, and thanked him for his kindness.

I wish you all a very happy New Year, and will never forget the great friendship between your nation and mine.

— Louis A. Esseling, PA9EP

## WORKED ALL STATES AIDS

2429 S. Harvey Ave.  
Berwyn, Illinois

Editor, QST:

As a ham who has spent two years, mostly on 40, working for a WAS certificate I would like to thank you for the SS contest during which I was able to work stations in two states which were still needed. A QSL card has already been received from one state and I hope to get the other soon.

I would like to suggest that more of the hard-to-get states

have QSO parties to help hams to get their WAS. I will always be grateful to the Vermont gang for having such a QSO party for otherwise I am sure I would still be without a contact from that State.

From my experience, I would suggest that hams in the States of Idaho, Nevada and Utah organize QSO parties similar to that held by the Vermont gang. No doubt other hams would add other States to the list.

Such QSO parties should get good publicity in QST and not be buried in the section news.

— George Nesbed, W0LQF

## QRP TEST

1209 S. Madison  
Bloomington, Ind.

Editor, QST:

We, the undersigned amateurs, would like to see a test run with all amateur stations using an input power to final stage of 50 watts or less on all amateur frequencies. This test could be run on Sundays, starting at 6 A.M. EST and ending at 3 P.M. EST. The day and time is given only as a suggestion.

Would you give this a thought and publish it in QST to get the reaction of other amateurs?

— A. Ray Elliott, W9HMA, and W9s EPJ, YXX, NZK, IEO, HIQ, INL, LPQ.

## ULTIMATIC

1207 Main Street  
E. Rochester, N. Y.

Editor, QST:

The "Ultimatic" key described in February QST is a development which should cause us all to pause and reflect on the direction toward which amateur radio is heading. A ham used to be proud of his fist. It was his trademark, the yardstick by which he was measured by the gang. Time was when a station could be identified by the speed of the rotary gap as well as by the operator's fist. Then came c.w. and all notes are "T9X," if we are to believe the reports. Now we believe there is something very personal about a man's fist. We learned code largely by copying the boats on Lake Erie and Lake Ontario. Any attempt to strip the individuality from a fellow's fist we regard as a serious threat to the future of amateur radio. Personally, we don't recall ever having been faced with the necessity of sending the word MICE for the last 33 years, but when some Johnny Come Lately pounds out NNGT, we want to hear it that way, and not as CQ. Webster defines "ultimate" as "to bring or come to an end." The "Ultimatic," coupled with the opening of 7 Mc. to 'phone, prompts me to break up my Audiotron and tear the wire off my honeycombs.

— Howard B. Mouatt, W8VVO

Hamden  
Connecticut

Editor, QST:

Description of the marvelous intelligence of Ultimatic is quite intriguing. If the transmitted copy actually were ZTRE, would the operator have to be particularly careful, to avoid sending MICE?

— Elmer E. Preston, W1AYC

## QRM TO NOVICES

W. Cornwall  
Vermont

Editor, QST:

I am just an ignorant new ham with a great deal to learn and doing my utmost to derive some enjoyment from a rig recently put on the air after years of hopeful wishing. Now what happens? With a Novice ticket and the limitations of bandspread the VEs plaster half of it on phone!

It would seem to me that steps might be taken to keep these fellows and gals up in the "wide-open spaces" and not have them jamming up the one-by-one "closet" the Novices have to operate in. Perhaps steps are underway for I certainly am not the only one they bother.

— Lee C. Warner, Jr., WN1WPT



## RULES AND REGULATIONS OF THE COMMUNICATIONS DEPARTMENT

1. The League maintains a Communications Department to effectuate the following purposes and objectives: The organization of members for practical communication, with particular attention to emergency preparedness and communications service in the public interest; the promotion and sponsorship of message traffic and emergency networks and systems; the promulgation of contests and other tests dedicated to furthering skill in amateur radio operating; the conduct of training aids and other programs for societies affiliated with the League; the recognition of outstanding public service and operator proficiency by the issuance of appropriate awards; the advancement through its operations of the spirit of fraternalism and a high standard of conduct among the members.

2. For the activities of the Communications Department the operating territory of the League is defined as consisting of the territorial Divisions described in By-Laws 25, plus the Republic of Cuba which shall be deemed for these purposes attached to the Southeastern Division. This operating territory is apportioned from time to time within the Divisions into Sections for the purpose of Communications Department field organization, by the Communications Manager.

3. In each Section there will be a Section Communications Manager (SCM), who, under the direction of the Communications Manager, will have authority over field organization appointments and ARRL operational programs within his Section. He shall be responsible to and report to the Communications Manager.

4. Any candidate for the office of Section Communications Manager must have been both a member of the League for a continuous term of at least one year and a licensed radio amateur operator for at least two years preceding receipt of his petition of nomination.

5. Each Section Communications Manager shall be elected for a two-year term of office. Whenever a vacancy occurs in the office of a Section Communications Manager, the Communications Manager will announce such vacancy, and the date for receipt of petitions, and call for nominating petitions signed by five or more Full Members of the Section in which the vacancy exists, and naming a Full Member of the Section as candidate for Section Communications Manager. After the closing date the Communications Manager will arrange for an election by mail and set a closing date for receipt of ballots. Ballots shall be sent to every Full Member of the League residing in the Section concerned. Candidates' names shall appear on the ballots in alphabetical order. The Communications Manager will determine the count of the ballots at the conclusion of

the election. The candidate receiving a plurality of the votes will become the Section Communications Manager. If there be but one eligible nominee, the Communications Manager shall declare him elected. *Provided*, however, that whenever the operating territory of a Section includes additional territory not part of the administrative divisions of the League but attached thereto for the activities of the Communications Department, Associate Members residing in the said attached territory and possessing amateur radio licenses shall be eligible equally with Full Members of the Section to hold or to nominate for and vote for the office of Section Communications Manager, provided they otherwise comply with the requirements of these Regulations. Section administration during the period required to complete an election may be covered by interim appointment by the Communications Manager.

6. The office of any Section Communications Manager may be declared vacant by the Executive Committee upon recommendation of the Communications Manager whenever it appears to be in the best interests of the membership so to do. On such declaration the Communications Manager will thereupon cause the election of a new Section Communications Manager as provided in paragraph 5.

7. Only ARRL members are eligible for field organization appointments. Station and leadership appointments shall be made available by the SCM to interested members possessing General Class license or higher, or equivalent Canadian license, also to members with Novice and Technician license in the case of the OES appointment, on application when their appointment qualifications and guarantees of activity and reporting may be demonstrated as adequate. Operating radio tests or station inspections under his direction may be required at the discretion of the SCM as pre-requisite to appointment.

8. The Section Communications Manager shall be responsible for operational planning and the holding of organization-meetings in his Section. He shall render monthly summary reports for *QST*, comprising the reports of section stations and clubs. He shall be responsible for maintenance of accurate records of dates of appointments and cancellations in all the leadership and station appointment categories; likewise he shall issue ARRL Section Net certificates to amateurs in ARRL sponsored nets, providing those so recognized meet a minimum standard of participation and activity as from time to time provided by him. He shall issue Brass Pounders' League certificates to those members whose traffic records meet the standards set forth in *QST* from time to time.

9. An Amateur Radio Emergency Corps is sponsored by ARRL. Every licensed amateur in the League's operating territory is eligible to register in either of two AREC membership grades, Full or Supporting. Emergency-powered equipment while desirable is not pre-requisite but will be recognized appropriately. (a) Full AREC membership will consist of those AREC registrants pledged to active participation as proved through drills, tests and regular activities. (b) The Supporting AREC membership will require only limited participation.

10. One Section Emergency Coordinator (SEC) shall be appointed by the SCM in each Section for section-level responsibilities pertaining to emergency communication and the organization of an Amateur Radio Emergency Corps. It shall be his duty (a) to promote AREC membership drives, meetings, activities, tests, procedures, etc., at section level (b) to recommend appointments and terminations of appointment for community Emergency Coordinators in areas of jurisdiction which he shall define as required (c) to recommend and report policy-planning on section emergency matters monthly (d) to maintain contact with other communications services and liaison at section level with all agencies served in the public interest, particularly in connection with civil defense and Red Cross functions.

11. The Emergency Coordinator (EC) shall have full responsibility (a) for preparing and keeping up-to-date emergency communications plans for the amateur service for the city, county or other local area jurisdiction designated by the SEC, for fullest utilization of all amateur stations and facilities (b) for maintaining full and current information on registrations in the Amateur Radio Emergency Corps. (Registrations are not considered an "appointment," so not subject to the restriction of paragraph 7.) (c) For certification of Assistant Emergency Coordinators (likewise not an SCM appointment) for advisory and operational duties (d) for records of agencies served and for continuing personal contact with their representatives for the purpose of evaluating emergency needs, recording the availability of amateur facilities, capabilities and limitations (e) for establishing and reporting appropriate drill periods and simulated emergency tests, including the designation of stations and operators and specification of recurrent drills to insure an efficient or adequate facility.

The Emergency Coordinator shall issue ARRL Official Mobile Unit, and Emergency Radio Unit cards to registered AREC members having operative units, as appropriate. Assistant Emergency Coordinators where appointed shall constitute a

local amateur service emergency planning committee.

12. A National Traffic System is sponsored by ARRL to facilitate the overall expeditious relay and delivery of message traffic. The system recognizes the need for handling traffic beyond section-level networks throughout the field organization territory. Definite provisions to facilitate this are therefore set up by areas and regions. Appointments in the National Traffic System for leadership above the section level are made under the direction of the Communications Manager.

13. One or more Route Managers (RM) shall be appointed by the SCM to coordinate and supervise c.w. traffic-handling activities in the section. Route Managers' areas of jurisdiction shall be as designated by the SCM. Route Manager duties shall be: (a) To organize and promote the section c.w. traffic net or nets. (b) To keep posted on c.w. traffic outlets maintained by section amateurs. (c) To provide liaison for the National Traffic System. (d) To recommend and test all applicants for Official Relay Station (ORS) as directed by the SCM. (e) To make recommendations and reports of c.w. traffic progress monthly to the SCM.

14. One or more Phone Activities Managers (PAM) shall be appointed by the SCM to coordinate and arrange organized communication activities within the Section by voice circuits. Phone Activities Managers' areas of jurisdiction shall be as designated by the SCM. Phone Activities Managers' duties shall be: (a) To organize and further a section radiotelephone station net to bear ARRL recognition; (b) to stand sponsor to other 'phone operating activities from time to time as appropriate in the name of the League; (c) to promote 'phone nets and round-tables and meetings devoted to handling communications, operator training and fraternal purposes; (d) to recommend candidates for Official Phone Station appointments and conduct station inspections and radio operating tests as directed by the SCM; (e) to report monthly progress in 'phone activities to the SCM.

15. *Station and Observer Appointments.* Each of the following station appointees shall (a) report activities monthly to the SCM; (b) keep his station in readiness for operation; (c) follow ARRL operating practices; (d) participate in League activities; (e) hold message files ready for call for verification of numbers or traffic count.

The *Official Relay Station* (ORS) appointment shall be granted by SCMs on application to those members meeting the general appointment qualifications who especially (a) display a high

(Continued on page 144)

On these pages we reproduce the new Rules and Regulations of the Communications Department, as adopted by the Executive Committee in January. This section completes the revision of the governing instruments in ARRL affairs; the Articles of Association, By-Laws, and other rules, earlier adopted, appear in the July, 1952, issue of *QST*.



# Operating News



F. E. HANDY, WIBDI, Communications Mgr.  
R. L. WHITE, WIWPO, Asst. Comm. Mgr., C.W.  
GEORGE HART, WINJM, Natl. Emery. Coordinator

J. A. MOSKEY, WIJMY, Deputy Comm. Mgr.  
ELLEN WHITE, WIYYM, Asst. Comm. Mgr., 'Phone  
LILLIAN M. SALTER, Administrative Aide

**The New Order of Things.** Amateur radio is normally a hobby of evolutionary development rather than one in which radical or revolutionary departures mark our progress. Our amateur bands are a "proving ground of communications." The development of the crystal filter, first transoceanic success on h.f., our inclusion as amateurs in civil defense (RACES), the progress of s.s.b. and RTTY, are all in this pattern. We have constantly to look forward and not backward. Nostalgia they tell us is but momentary escape from a world in which change is the rule. Just for example, five-point star system schedules for traffic relaying are outdated and the National Traffic System offers advantages above earlier plans giving only some states as outlets. The section net is today the unit for individual participation in NTS, and a radiogram to Hq. will bring a directory of nets, net frequencies and operational times to any amateur on the air.

The month of February marked operation under new FCC regulations permitting General and Conditional class amateur licensees use of the 20- and 75-meter 'phone subbands; allocating 7175-7200 kc. for Novices; permitting all except Novice and Technician licensees 7.2-7.3 Mc. 'phone and use of F-1 teletype in those band sectors not open to voice work. It's no use to be nostalgic about the yesterdays in amateur radio; the thing is to do the best job with what we've got.

'Phone on Forty is new, and the general use of 20- and 75- 'phone, likewise for all except Novice and Technician amateurs, is a new order of operations. The bands aren't any larger and *how we use them*, as always, determines the level of interference, and how much intelligence we can convey in the course of our two-way communications. The 7175-7200 kc. earmarked for Novices isn't a large band as bands go, but is in the direction of your Board's recommendation, and is sure to become popular with Novices for code and WAS progress. F-1 radioteletype in those 20-, 40- and 80-band sectors not open to voice work opens up opportunity for some traffic circuits to be maintained by this means. What we do with these new tools depends on how we handle them. We can do well if we have vision and sense and a working of all amateur groups together instead of at cross-purposes. Our early adjustment to changes is the keynote to success and progress. Full integration and tie-ins between c.w. and 'phone nets and any new RTTY circuits, using the customary method of common membership in different kinds of nets, should give us the

best over-all communication means of message distribution to every town and city in the land.

The use of 20 and 75 meters for 'phone will be especially welcomed by those amateurs who have felt the pinch of fewer good operating hours on 10 meters in this part of the sunspot cycle. A number of ARRL section 'phone nets have already issued cordial invitations to newcomers to join in net operations. For still greater extension of traffic coverage, ARRL suggests the appointment in each such net by the NCS of a liaison station that can secure messages from and take messages to the c.w. net in that same state. This should assure message deliveries via the city and outside coverage of *both* our 'phone and c.w. nets. Cordial invitation to all is likewise extended to review page 130, Jan. QST, on the Official 'Phone Station appointment. Report monthly voice activity to your SCM (address on p. 6) and ask him for the OPS application form.

Early indications are that 40-meter 'phone will be quite popular. Some will already have tried it in the second week of ARRL's DX Test. Forty is a proven band, a favorite for years of consistent productive amateur use, both tops in general contact work and for specific purpose schedules. Some c.w. nets are registered there; some are planning moves within Forty in which they hope to find clear operating spots, some frequencies free from broadcast interferences from outside the Americas or from amateurs. There will be some new 'phone nets. We're happy to consult present and future Net Registration lists to help coordinate any and all plans for net or systematized use, to avoid or minimize potential interference. What happens DX-wise in distribution of amateur stations in this band in the face of these changes remains to be seen.

Frequency-shift radioteletype now can be used as an additional h.f. band privilege. Such circuits with 60-w.p.m. capability can be envisioned as paralleling, assisting and supplementing present organized c.w. and 'phone networks. RTTY work to date has been more experimental than traffice-wise. Single RTTY circuits set up by amateurs have proved themselves ideal for distribution from a collection point (as from N.Y.C. and Los Angeles exhibit stations last holiday season) to the c.w. and 'phone nets having organized outlets. Bearing in mind that until there are many more stations active by this mode than now only full tie-ins with existing nets can give wide distribution of traffic to all points, this can all be changed if enough of the teletype gang set their sights on a traffic objective to

prove the real merit such equipment possesses in that direction. SCMs will welcome reports of traffic and other results from all using RTTY, and our same net registration facilities can be used to minimize QRM. If their interest is "traffic interest" those reporting members using c.w. or RTTY are likewise eligible for ORS appointment if they report their traffic activity and apply to the SCM for such recognition.

Now there's one thing more we can try to do to help give point (and place) to organized teletypes. That's to specify by voluntary agreement and designation additional *National Calling and Emergency frequencies for RTTY*, and another working frequency in each band, for traffic or extensive rag-chewing using this mode. Such voluntary planning in this field corresponds closely to accepted amateur pattern and practice. Ham nets call their roll on one channel, with extensive operation and traffic on neighboring channels. A large group in v.h.f. mobile and teletype work with interest in auto alarms has already utilized the principle on one ARRL common *calling* frequency, 29,640 kc. Having such a frequency helps any group get together, promoting ease of getting results. For RTTY users, as with the c.w. or 'phone counterpart, such a plan calls for a minimum number of TT-user crystals (for stability and frequency insurance). From the standpoint of the *general amateur* user of a band, it minimizes danger of sporadic RTTY interference to have such designations. This is the best protection for the RTTY gang itself, since general squawks to FCC about QRM might lead to tighter frequency-band restrictions for the teletype. If the RTTY gang is to have a chance to use such gear in RACES, a channel or two in the 3500- to 3510-kc. RACES segment should be suggested soon by FCDA. Such is under consideration at present. A *working* frequency here is not at this date of writing possible, but word is awaited soon. Tentatively a *calling* frequency at 3620 kc. has been designated, after study in the Amateur Radio Teletype Society of ARRL Net Directory registrations. Word is awaited likewise from the Southern California Radio Teletype Society concerning additional *radioteletype* calling and working frequencies that have been tentatively put forward by ARRL for study and comment; these have the advantage of keeping clear of VE 'phone and DX band-edge frequencies and allow doubling and tripling from single (control) frequencies:

<i>RTTY Calling and Emergency Frequency</i>	<i>RTTY Working Frequency</i>
3620 kc.	3.5-3.51 Mc. (under study)
7070 kc.	7075 kc.
14,140 kc.	14,150 kc.
21,210 kc.	21,225 kc.

All readers and especially those with RTTY interest are invited to try out the above channels for calling and working and then to comment. Interest in teletype work is on the increase; note that two societies are already making RTTY their major purpose. If there are still others, let's hear from you. — F. E. H.

## MEET THE SCM

Vermont's SCM, Raymond N. Flood, received his first license with his present call, W1F8S, in February, 1933. His station, located in the bedroom, consists of an HT-18 VFO, 807 buffer-doubler, two T-53s final, 200 watts, and an 8X-71 receiver. Folded dipoles are in regular use for 10, 20, 40, and 80 meters.

SCM Flood has held Official Relay Station, Official 'Phone Station, Official Bulletin Station, and Emergency Coordinator appointments and is a charter member and president of the Tri-County Amateur Radio Club. An ardent participant in ARRL contests, he was section winner in the 1950 10-Meter WAS Contest, the 1951 Sweepstakes, and the 1951 DX (c.w.) Contest. In addition to Code Proficiency, DXCC, and WAS certificates, W1F8S also



has been issued Public Service certificates for his noteworthy work during the New England Flood of 1936 and the 1950 Northeastern Hurricane. During the 1936 flood he set up his transmitter at police headquarters in Brattleboro and, operating with emergency power, handled a quantity of press and other information.

Ray also is interested in astronomy and science and participates in such active sports as swimming and skiing. He obtained his commercial radio experience as radio operator and monitoring officer for the Federal Communications Commission and as radio operator for the Merchant Marine. At present he is a bindery foreman, employed by the Vermont Printing Company.

## W1AW OPERATING SCHEDULE

A detailed schedule of W1AW operations appeared on page 67 of March QST. This schedule remains in effect without change. The next listing of Headquarters Station operations will appear in the April issue.

## A.R.R.L. ACTIVITIES CALENDAR

Apr. 3rd: CP Qualifying Run — W6OWP  
 Apr. 11th-12th: CD QSO Party (c.w.)  
 Apr. 16th: CP Qualifying Run — W1AW  
 Apr. 18th-19th: CD QSO Party ('phone)  
 May 9th: CP Qualifying Run — W6OWP  
 May 15th: CP Qualifying Run — W1AW  
 June 6th-7th: V.H.F. Contest  
 June 7th: CP Qualifying Run — W6OWP  
 June 15th: CP Qualifying Run — W1AW  
 June 20th-21st: Field Day  
 July 3rd: CP Qualifying Run — W6OWP  
 July 14th: CP Qualifying Run — W1AW  
 July 18th-19th: CD QSO Party (c.w.)  
 July 25th-26th: CD QSO Party ('phone)  
 Aug. 1st: CP Qualifying Run — W6OWP  
 Aug. 12th: CP Qualifying Run — W1AW



Most amateurs who jump in at the crucial time and perform a public service using their own time, their own facilities, and more often than not their own pocketbooks, do it because of the satisfaction they get out of knowing that their efforts have brought comfort, safety or preservation to someone. Once the thing is over, they forget it and look ahead to see how they might be better prepared next time. We think this is the proper and most beneficial attitude, and the attitude with which most service-minded amateurs approach this phase of amateur radio.

This is the real spirit of public service, which the League recognizes by issuing Public Service Awards. Thousands of these awards have been made and most of them have been well deserved. A few may inadvertently have been given to amateurs whose eligibility was questionable. The question as to who shall and who shall not get a Public Service Award has been troublesome. One *doesn't ask* for such an award, you know. For general information and reference as needed we print the definite policy to be followed now and henceforth on Public Service Awards.

1) Public Service Awards are issued only to amateurs who actually participated in a communications emergency involving the health or safety of a segment of the general public.

2) The Public Service Award is a spontaneous recognition of service performed, and is not issued to any amateur who asks for or demands it.

3) It is issued only if the service performed is reported to ARRL and publicized in *QST* within a reasonable time. Such issuance is not normally made until after the issue of *QST* containing the account of the emergency is in distribution (so it can be referred to on the certificate).

4) ARRL will value the recommendations made by SCMs or other field officials and will act on them provided the above requirements are met. But no amateur should work for a Public Service Award. The aim should be performance, not reward. The PSA is simply a means of recognition, not an end in itself.

We want to keep the standards high, and we think you do too. As indicative of this, some recipients of the award have on occasion even returned their certificates saying they did not feel they really deserved them, that all they did was report into an emergency net during an emergency. These fellows deserve at least an A for attitude as compared to one "demanding" the certificate, which states on its face it is *unsolicited!* The general experience gives fraternity approval to the above policy.

Note we have a new National Calling and Emergency Frequency for 40-meter 'phone. Still to be selected are similar frequencies on 21 Mc., both 'phone and c.w. Who has some suggestions? We have not yet picked NCE frequencies on this band, pending some expressions of sentiment from the field. If we don't get any, we'll have to pick them at random. Let's hear from you, gang.

Speaking of NCE frequencies, we have recently received a request from W6SLX that we ask all amateurs to listen before transmitting on NCE frequencies. A good suggestion, but it should apply to *all* frequencies. Always listen on your transmitter frequency before throwing on that carrier! We cannot avoid QRM on our bands, but if we are a little careful we can avoid QRM to emergency operations. All it takes is a little consideration.

As for the NCE frequencies, particular care should be taken to listen before transmitting. We do not believe in the practicability of keeping them clear for calling purposes only, but we ought to have one frequency on each band on which we can make directional or general calls for assistance, be it emergency or otherwise. If you *must* use one of them for other purposes, please give a listen first to make sure you are not camping on something important.

On January 14th, southwestern Minnesota was hit by a severe sleet storm followed by a blizzard that crippled

telephone and telegraph communications in that area. The town of Fairmont was the hardest hit. W0RPT and W0BZT of Fairmont immediately went on the air on a full time basis. During the blizzard they acted as emergency control stations and alerted stations in St. Paul, Minneapolis, Albert Lea, Mankato, Worthington, Jackson, Faribault, Sioux City and Mason City as outlets for traffic. Much Western Union traffic was handled, and new reports were relayed from W0RHT in Minneapolis to W0RPT and then to the local radio station for transmission. Approximately 200 emergency messages were handled. Stations participating were W0RPT ZTB FIT RHT JDO MXC BQJ LCM FAJ ATD BHY UCV JIE and TJA. — W0MXC, SCM Minn.

We have a brief statistical report from W1RFJ on "Operation Icicle," detailing some of the work performed by the Stratford AREC gang during an early-January ice storm in southern Connecticut. The operation was largely concerned with servicing units of the Stratford Public Works Department. Operating on the 10-meter band, main control was W1WIG, with subcontrols W1TLO and W1RCV also active. W1TLO was operating on emergency power. Mobile units participating were W1s BGP FMU GVK IAY and TCW. Operation was conducted over a period of 21 hours. The clock-like efficiency of this well-organized AREC unit was much appreciated by Stratford officials.

Approximately 100 amateurs assisted in "Operation Palisades," a civil defense alert conducted in N. J. Civil Defense Area 1 on Nov. 22, 1952. Nineteen fixed stations and 20 mobiles were spotted throughout the area, with some 100 or more messages being handled during the exercise which lasted from 1300 until 1500. Two networks — one of fixed stations and the other of mobiles and portables were in operation. Amateur Radio Coordinator Steve McCallum, W2ZBY, expresses pride with which the boys maintained strict on-the-air discipline and performed their jobs with efficiency and dispatch. He also asserts that conscientious drilling was the biggest single factor that made this possible.

A great deal was learned by the San Bernardino AREC gang during a simulated emergency on Nov. 23, 1952. The simulated disaster was an A-bomb drop on Los Angeles. The alert was at 0900 and when it was wrapped up at 1811 all the AREC members knew that they had had a workout like they never had before. The expert traffic handlers (and we have many) carried the load, but all available operators got a chance to operate, which was a real initiation to some of them. The traffic count at the San Bernardino County NCS (W6IZP) was 380. All stations except two were portable. Twenty-five mobiles were on call but not used in this operation as all operators were needed to handle the unexpected volume of official c.d. traffic. Over 50 amateurs participated. The two most important things we learned are: (1) all (even the experts) need more net and traffic experience; (2) more portable self-powered gear is needed. — W6HKD, EC San Bernardino Area, Calif.

On December 7, 1952, thirty Milwaukee Radio Amateurs' Club mobile and Emergency Radio Truck crew members participated in a highly successful civil defense exercise involving every piece of fire apparatus in the city. After a briefing session, 19 mobiles traveled to dispersal points where they were joined by fire trucks and supporting vehicles. Communications to the mobile dispersal battalions was provided by using the MRAC Emergency Radio Truck, which was connected to the control center by field telephone. Operation was simultaneous on 75- and 10-meter 'phone no any mobile in the area would be able to take part. The Emergency Truck operated under its call W9HRM. The Marquette University Amateur Club station W0DD assisted as a repeater.

Sixty messages were handled in all, mostly involving the movement of fire-fighting equipment. Officials were amazed at the excellent dispatch with which traffic was handled. The test was well reported in the local press and TV news shows with full credit to the amateurs participating. — W9SNK

Sixteen SEC reports received for December, 1952, activities, representing 2891 AREC members. This winds up the year, and perhaps a brief summary is in order. The following

sections were represented 100% in 1952: East Bay, E. Fla., Tenn., W. N. Y. These reported better than 6 of the 12 months: Ark., B. C., Colo., Ga., Los A., Santa Clara Valley, Sask., Wis., S. N. J., So. Dak., Nevada, N. Y. C. These reported 6 times or less (but they did report); Maine, San Diego, Ala., Montana, Okla., W. Mass., Wash., Indiana, Iowa, W. Va., Vt., Nebr., Mo. A total of 29 sections out of 72. It shouldn't be much of a trick to do better than that in 1953, should it? Remember, it isn't necessarily your SEC who is at fault. He can't very well report anything if he doesn't receive any EC reports to base reports on.

## CODE-PRACTICE STATIONS

The following is an up-to-date list of all stations transmitting code practice in the ARRL Code-Practice Program:

W1ACT, Fall River ARC, 57 Richmond Street, Fall River, Mass. 3545 kc., Mon., Wed., Thurs. and Fri. 1900 EST, beginners' speeds.

W1MNG, Arthur Zavarella, 1702 Main Street, Agawam, Mass. 29,500 kc., Tues. and Thurs. 1900-1930 EST, advanced speeds.

W1SRB, Al Vesce, 84 North Main Street, Thompsonville, Conn. 29,600 kc., Mon., Wed. and Fri. 1930-2030 EST, beginners' speeds.

W1VBG, Carl Norris, 128 Meadow Street, Westfield, Mass. 29,500 kc., Tues. and Thurs. 1830-1900 EST, beginners' speeds.

W2FSL, Adolph F. Elster, 53 Commercial Avenue, Avenel, N. J. 3675 kc., Sat., Sun. and holidays. 0730-0800 EST, beginners' speeds.

W2GNI, Jim Chupp, 85 West Main Street, Smithtown Branch, N. Y. 1895 kc., Mondays. 2000-2030 EST, beginners' speeds.

W2HEI, William Teso, Mountain Avenue, Hillburn, New York. 3950 kc., Sat. and Sun. 1400-1500 EST, 5-18 w.p.m.

W4ITY, Andrew C. Clark, 41 Lenape Drive, Miami Springs, Fla. 28,700 kc., Mon. through Fri. 2030-2130 EST, beginners' speeds.

W4RUR, E. J. Blatt, 536 16th Avenue So., St. Petersburg, Fla. 28,050 kc., Mon. and Wed. 1900-1950 EST, 6, 9, 14, 18 and 22 w.p.m.

W5MRD, Omer Sanders, Box 194, Danville, Arkansas. 3885 kc., Mon., Wed. and Fri. 1600-1630 CST, 5, 7, 10 and 15 w.p.m.

W6JZ, Ray Cornell, 909 Curtis Street, Albany, Calif. 3590 kc., Mon. and Fri. 5, 7½, 10, 13 and 20 w.p.m., and Wed. 15, 25, 30, 35 and 45 w.p.m., 1845 PST.

W7FWD, O. U. Tatrow, 513 N. Central, Olympia, Wash. 3646 kc., Mon. through Fri. 1700 PST, 4, 6, 16 and 25 w.p.m.

W7RKA, Zane Casey, Route 2, Box 73, Hood River, Oregon. 7280 kc., Mon. through Thurs. 1930-2000 PST, 3, 5 and 8 w.p.m.

W9ODD, Stephen P. Victor, 615 N. 15th St., Milwaukee, Wis. 29,224 kc., Mon., Wed. and Fri. 1930-2030 CST, beginners' speeds.

W9UIN, Joseph H. Kadlec, 1148 Ashland Ave., Evanston, Ill. 7240 kc., Sat. and Sun. 0800-0900 CST, 5-7½ w.p.m.

W9BOL, R. A. Prehm, 1130 Delaware Avenue, St. Paul, Minn. 29,200 kc., Tues. and Wed. 1900-1930 CST, individual letters to 6 w.p.m. and 8-15 w.p.m. practice.

W9EGQ, Robert McMullin, Route 1, Leigh, Nebr. 3690 kc., Mon. through Fri. 1700-1745 CST, 5, 7½, 10 and 13 w.p.m. with text from the *Braille Technical Press*.

W9FXH, Quentin Johnson, 125 N. Berry Rd., Glendale 19, Mo. 29,500 kc., Mon. and Wed. 1900-1945 CST, 3, 5 and 7 w.p.m.

W9QDF, W. H. Du Bord, 10247 Midland, Overland, Mo. 29,600 kc., Mon. and Wed. 2000-2100 CST, 5, 8, 10 and 13 w.p.m.

## CODE-PROFICIENCY PROGRAM

Twice each month special transmissions are made to enable you to qualify for the ARRL Code Proficiency Certificate. The next qualifying run from W1AW will be made on April 16th at 2130 EST. Identical texts will be sent simultaneously by automatic transmitters on 1897, 3545, 7130, 14,100, 21,020, 28,060, 52,000 and 146,000 kc. The next qualifying run from W6QWP only will be transmitted on April 3rd at 2100 PST on 3590 and 7248 kc.

Any person may apply; neither ARRL membership nor

an amateur license is required. Send copies of all qualifying runs to ARRL for grading, stating the call of the station you copied. If you qualify at one of the six speeds transmitted, 10 through 35 w.p.m., you will receive a certificate. If your initial qualification is for a speed below 35 w.p.m., you may try later for endorsement stickers.

Code-practice transmissions are made from W1AW each evening at 2130 EST. References to texts used on several of the transmissions are given below. These make it possible to check your copy. For practice purposes, the order of words in each line of QST text is reversed during certain of the slow-speed transmissions. To get sending practice, hook up your own key and buzzer and attempt to send in step with W1AW.

Date	Subject of Practice Text from February QST
April 1st:	<i>The "Ultimate"</i> , . . . p. 11
April 2nd:	<i>Structural Details of the Detroit C.D. Portables</i> , p. 16
April 7th:	<i>An 80-and 40-Meter Antenna System for the Novice</i> , p. 29
April 10th:	<i>The Clapp Oscillator — and How</i> , p. 10
April 13th:	<i>Mechanical Bandpass Filters</i> , p. 22
April 15th:	<i>A Self-Contained VFO Rig</i> , p. 25
April 21st:	<i>Low-Voltage Filament Supplies</i> , p. 35
April 24th:	<i>Practical Adjustment of the Gamma Match</i> , p. 32
April 27th:	<i>Magnetic Ceramics: Ferrites</i> , p. 44
April 30th:	<i>Notes on V.H.F. Converter Design</i> , p. 52

## DX CENTURY CLUB AWARDS

### HONOR ROLL

W1FH.....250	G2PL.....242	W3CPV.....235
W8HGW.....246	W6AM.....238	W6SN.....235
W6VFR.....244	W3GHD.....237	W4BPD.....234
W3BES.....244	W3JTC.....237	W6MEK.....234
W9YXO.....244	W2BXA.....236	W8NBK.....233
W6ENV.....242	W3KT.....236	W3EVW.....233
	G4ZO.....236	

### RADIOTELEPHONE

W1FH.....223	W8HGW.....202	W6DI.....195
PY2CK.....222	Z86BW.....201	8M5KP.....195
VQ1ERR.....216	W9RBI.....200	W2APU.....194
XE1AC.....213	W1JCX.....200	W2BXA.....194
W1NWO.....204	W1MCW.....195	

From January 15, 1953, to February 15, 1953, DXCC certificates and endorsements based on postcard contacts with 100-or-more countries have been issued to the amateurs listed below.

### NEW MEMBERS

G2WW.....178	W4DRK.....103	W4EXO.....100
DL1KB.....127	EA9AP.....103	W4HYW.....100
DL3GZ.....118	SM7VX.....103	DL1VR.....100
W9VIP.....106	W8LWG.....101	V86BA.....100
W2VRE.....103	W1DRF.....100	Z86FK.....100

### RADIOTELEPHONE

G2WW.....136	G3HLS.....105	F3PW.....101
PY2AHS.....110	E1ZL.....104	W6SAI.....100
	HB9LA.....103	

### ENDORSEMENTS

W3GAU.....231	KG4AF.....166	W3AYS.....122
W3OCU.....220	CN8MI.....161	SM3AKM.....121
W6AMA.....220	W2UWD.....142	W2YTH.....120
W6SAI.....211	Z85CU.....142	CE4AD.....120
W4TMM.....202	ON4GC.....141	V86AE.....120
W5GEL.....201	W1ZD.....134	W5YIN.....117
G8IG.....201	W6MEL.....134	W5OLG.....116
W8BKP.....200	PA9LR.....132	SM5AQW.....112
W2BJ.....190	SM5AQV.....132	W4OSU.....111
GM3DHD.....190	W2ATE.....130	W3WI.....110
W9TKX.....172	11UB.....130	W5YK.....110
W9FJN.....171	LA2B.....129	VE3ADM.....110
ON4NC.....171	PY2DV.....128	V53HB.....110
W7AH.....166	W3CTJ.....127	

### RADIOTELEPHONE

W9ROQ.....178	OD3AB.....154	Z83CU.....126
GM3DHD.....170	W3EVW.....152	

## TRAFFIC TOPICS

A printed page without an illustration on it is something the average reader quickly skips and goes on to a page a little less dull. We try to get some kind of pictures, diagrams or cartoons on these pages every month, but we are scraping the bottom of the barrel and need some help.

Don't any of you traffic men own cameras? Send us a snap of yourself at your operating position, or some ideas for cartoons or something. Or do you want us to carry out a threat made long ago to start printing pictures of ourselves?

Miscellaneous January traffic reports: (1) The Transcontinental Relay Net handled 3034 messages in 31 sessions, averaging 98 per session; six stations were active. (2) The Transcontinental Phone Net handled 2154 messages during January; 43 stations participated. (3) The Early Bird Transcontinental Phone Net handled 177 in 13 sessions, averaging 13 per session; 31 stations participated.

**National Traffic System:** You have to hand it to the boys. We are having one of our best seasons yet, from an organizational standpoint, but it certainly is not because of the excellent traffic-handling conditions we have had. Propagationwise, the weather has been horrible. The few who have given up have our sympathy — but the fact is that they are very few. Generally speaking, it is heartwarming to hear the guys keep trying when signals are so weak and watery as to be all but inaudible. Once in a while we are treated to nothing worse than bad QRN, but when QRN and QSB combine it's wicked. And we have heard many DX men talk about the excellent conditions on 80 this year! Goes to show you, it's all in the point of view.

One noticeable thing has been that conditions for local contacts are not too bad before 1900 local time. In view of the fact that most section nets are not observing the 2200 NTS-recommended session anyway, some of the regional nets are likewise ceasing operation of their 2130 sessions and/or having an early early session at 1800 or 1830. This early session can take the place of the night-before late regional sessions, and can dovetail nicely into the 1900 section net.

Considering everything, it's not a bad idea. We are not changing the NTS structure because of what (we hope) is a temporary condition, but one might well consider that this would come under the heading of a "temporary expedient to insure movement of traffic." Regional managers might do well to consider the possibility. Come spring or summer, perhaps the long-skip evening characteristics of 80 will taper off and we can return to normal schedules.

### January reports:

Net	Sessions	Traffic	High	Average	Most Consistent
EAN	22	501	52	22.7	1RN, 4RN
CAN	18	394	77	22.1	9RN, TEN
PAN	22	693	208	31.5	All
1RN	30	189	21	4.8	W. Mass.
2RN	44	239	16	5.4	NJN
3RN	31	182	24	5.8	W. Pa.
4RN	30	268	29	6.8	Fla.
RN5	44	286	27	6.8	Ala., La., N. Tex.
RN6	40	805	93	20.2	BAN
RN7	54	512	71	9.5	Wash.
8RN	36	105	17	3.0	Ohio
9RN/TLJ	26	466	70	18.0	Ind.
TEN	30	743	62	24.7	Most 100%
TRN	44	82	8	1.8	Ont.
MSN (Minn.)	27	148	15	5.5	
QIN (Ind.)	77	765	59	9.9	
TLCN (Iowa)	22	413	43	18.7	
Total	614	6791	268	11.0	
Record	649	8064	268	14.2	

A very interesting EAN bulletin by W8SCW reveals that EAN handled 9120 messages in 1952, an average of 33.5 per session. The net got together 270 times, with 2RN missing only two sessions and 1RN only three. Forty-eight EAN certificates have been issued since the start of EAN, and they haven't been easy to get. Latest recipients of certificates are W1AYC, W4SHJ, W4UWS and VE2AMB. EAN has a record to be proud of.

Four CAN NCS reports were missing in January. W9JUL appreciates the help received during this period.

1RN certificates have been issued to W1s CUH FTH HRV KYO MX and NDB. Due to bad conditions, W1BVR has promised to give credit for attendance to anyone who says he was on but couldn't be heard by the NCS.

Thirteen 3RN sessions were missed in January due to skip.

4RN is getting some QRM on 3615 kc. from a Swiss commercial.

W5QHI, new RN5 manager, indicates bad need for a representative or two from Western Florida section. Any takers?

RN6 now includes Arizona, Colorado, New Mexico and Utah, embracing the former twelfth Regional Net. W7UTM has been representing Utah. How about the rest?

New RN7 manager W7PKX says he received wonderful support from the gang for his first report. He suggests Hq. make available a printed form for weekly statistics, to be used by net managers. Anybody else feel a similar need?

A new and very fine net bulletin has been put out by W8DSX, 8RN manager.

W9PVH has received a 9RN certificate.

VE4HL has received a TEN certificate. He takes the place of an old standby, VE4AM, who passed away recently.

VE2AMB is doing a big but lonely job in representing Quebec on TRN.

## BRASS POUNDERS LEAGUE

Winners of BPL Certificates for January traffic:

Call	Orig.	Recd.	Rel.	Del.	Total
W6LAB.....	62	2573	2413	74	5122
KG6FAA.....	276	1469	1363	76	3184
W6KYV.....	113	1372	718	648	2851
W7IOQ.....	43	1364	1	1372	2780
W2BTB.....	42	1239	1310	32	2623
W9TQD.....	4	972	940	12	1928
W4USA.....	103	696	699	97	1595
W9JUL.....	35	825	683	10	1562
W4PL.....	12	763	696	84	1525
KA2HQ.....	325	476	204	255	1260
KG6ADZ.....	28	596	596	26	1246
W8AUJ.....	15	605	512	55	1187
K6FCA.....	14	540	495	32	1081
KZ5AA.....	84	486	387	49	956
W7BA.....	31	435	407	28	901
W9KHQ.....	5	438	434	4	881
W8SCA.....	3	428	424	4	859
K4WAR.....	146	305	298	75	824
W8CPL.....	10	375	348	27	760
W2ZOL.....	5	412	294	15	726
W6HK.....	71	318	251	67	707
W8HJC.....	18	319	291	27	655
W2RUF.....	34	319	259	39	651
W7ONM.....	7	305	301	7	620
W6GQY.....	5	401	197	4	607
W6GYH.....	14	296	172	119	601
W8NZZ.....	8	281	274	6	569
KL7AIR.....	16	265	266	15	562
W5MN.....	31	260	67	201	559
W8BVL.....	5	269	265	8	547
W8BDR.....	3	267	255	6	531
W9NZD.....	149	189	0	189	527
W2BO.....	15	252	210	42	519
W6VHN.....	8	256	239	13	516
W4AKC.....	8	277	204	20	500

### Late Reports:

W3PZW (Dec.)...	30	1248	1208	40	2526
KL7LJ (Dec.)...	150	800	689	111	1750
W2NSD/2 (Dec.)...	1683	0	0	0	1683
KG6ADZ (Dec.)...	29	517	517	31	1094
KA8AB (Dec.)...	141	230	191	39	601

BPL for 100 or more origination-plus-deliveries:

W4WLH 230	K9FAM.....	110	Late Report:
W4WHC .119	W4DRD.....	116	W3CVC (Dec.) 129
	W6UWL/KH6	102	

The BPL is open to all operators who report to their SCM a message total of 500 or more or 100 or more origination-plus-deliveries for any calendar month.

## ELECTION NOTICE

(To all ARRL members residing in the Sections listed below.)

You are hereby notified that an election for Section Communications Manager is about to be held in your respective Sections. This notice supersedes previous notices.

Nominating petitions are solicited. The signatures of five or more ARRL full members of the Section concerned, in good standing, are required on each petition. No member shall sign more than one petition.

Each candidate for Section Communications Manager must have been a licensed amateur for at least two years and similarly a full member of the League for at least one continuous year immediately prior to his nomination.

Petitions must be in West Hartford, Conn., on or before noon on the closing dates specified. In cases where no valid nominating petitions were received in response to previous notices, the closing dates are set ahead to the dates given herewith. The complete name, address, and station call of the candidate should be included with the petition. It is advisable that eight or ten full member signatures be obtained, since on checking names against Headquarters files, with no time to return invalid petitions for additions, a petition may be found invalid by reason of expiring memberships, individual signers uncertain or ignorant of their membership status, etc.

The following nomination form is suggested: (Signers will please add city and street address to facilitate checking membership.)

Communications Manager, ARRL [place and date]  
38 La Salle Road, West Hartford, Conn.

We, the undersigned full members of the .....  
..... ARRL Section of the .....  
Division, hereby nominate .....  
as candidate for Section Communications Manager for this  
Section for the next two-year term of office.

Elections will take place immediately after the closing dates specified for receipt of nominating petitions. The ballots mailed from Headquarters to full members will list in alphabetical sequence the names of all eligible candidates.

You are urged to take the initiative and file nominating petitions immediately. This is your opportunity to put the man of your choice in office.

— F. E. Handy, Communications Manager

Section	Closing Date	SCM	Present Term Ends
Iowa	Apr. 1, 1953	William G. Davis	June 16, 1953
Yukon *	Apr. 15, 1953	W. R. Williamson	Mar. 17, 1949
West Indies	Apr. 15, 1953	William Werner	Aug. 15, 1952
Maritime *	Apr. 15, 1953	Arthur M. Crowell	Oct. 16, 1952
Hawaii	Apr. 15, 1953	John R. Sanders	Jan. 14, 1953
Maine	Apr. 15, 1953	Orestes R. Brackett	Apr. 16, 1953
South Dakota	Apr. 15, 1953	John W. Sikorski	July 2, 1953
Western Florida	May 15, 1953	Edward J. Collins	July 29, 1953
N. Y. C.-L. I.	May 15, 1953	George V. Cooke, Jr.	July 31, 1953
Eastern Florida	May 15, 1953	John W. Hollister	July 31, 1953
North Carolina	June 1, 1953	J. C. Geaslen	Aug. 15, 1953
East Bay	June 1, 1953	Ray H. Cornell	Aug. 16, 1953
Southern New Jersey	June 15, 1953	Lloyd L. Gainey	Aug. 26, 1953

\* In Canadian Sections nominating petitions for Section Managers must be addressed to Canadian Director Alex Reid, 160 Logan Ave., St. Lambert, Quebec. To be valid such petitions must be filed with him on or before the closing dates named.

## ELECTION RESULTS

Valid petitions nominating a single candidate as Section Manager were filed by members in the following Sections, completing their election in accordance with regular League policy, each term of office starting on the date given.

San Diego	Edgar M. Cameron, Jr., W6FJH	Dec. 15, 1952
Minnesota	Charles M. Bove, W6MXC	Feb. 17, 1953
Missouri	C. L. Arundale, W6GBJ	Mar. 1, 1953
Wyoming	L. L. Daily, W7JDB	Mar. 1, 1953
Western Pennsylvania	R. M. Heck, W3NCD	Mar. 17, 1953
Md.-Del.-D. C.	Arthur W. Plummer, W3EQK	Mar. 21, 1953
Los Angeles	Howard C. Bellman, W6VJV	Apr. 13, 1953
Santa Barbara	Vincent J. Haggerty, W6IOX	Apr. 12, 1953

## JANUARY CD QSO PARTIES

Both the c.w. and 'phone sections of the January CD Parties were lively affairs. The usual large group of appointees were in there pounding away on c.w. and the 'phone shindig brought out more than the usual number of participants. Leading contender for c.w. score honors was W6CMN; Bill scored 125,104 points and carried on the determined effort made by the West Coast contingent to keep their area of the field organization in the limelight. Runner up on points, and leading all comers in number of contacts was W4KFC with 117,150 points and 419 QSOs. W1EOB was third in line, 112,720, and earned the distinction of working more sections than any other contestant, 59. In the 'phone fracas, W4NYN turned in a sterling performance, scoring 31,500 from 140 contacts with 45 sections. Second highest 'phone total was chalked up by W8NOH, who worked the same number of sections as third place entrant W4NYN, but managed thirteen more contacts. Listed below are the other high claimed scores. The figures following each call indicate the claimed score, number of contacts and number of ARRL sections worked. Final and complete results will appear in the April CD Bulletin.

### C. W.

W6CMN	125,104-246-56	W2KEL	56,870-235-47
W4KFC	117,150-419-55	W8HOX	56,810-242-46
W1EOB	112,720-411-50	W9GL	56,250-225-50
W8NBK	96,990-359-53	W9JNC	55,750-217-50
W4SHJ	96,600-338-66	W9LRG	55,500-222-50
W7KWC	89,964-196-51	W6MCC	54,315-209-51
W4SAT	85,860-319-53	W2VNI	53,970-250-42
W4BZE	84,270-313-53	W1AQE	52,140-237-44
W1MX	80,590-316-51	W3AXA	50,095-229-43
W1AW*	77,000-301-50	W2CWX	50,095-227-43
W8NOH	73,185-282-51	W8SDK	49,750-192-50
W8ZJM	71,655-275-51	W9MEM	49,220-211-46
W7OPO	69,975-165-47	W3NRE	48,600-190-54
W9VBQ	68,380-258-52	W9PHR	47,150-205-46
W3LXE	65,250-261-50	W2NTY	46,440-210-43
W4FF	63,450-264-47	W1LK	45,500-182-30
W2ZVW	62,500-243-50	W2ATE	45,100-205-44
W6VHM	61,909-153-44	W4SNH	45,000-195-45
W1CRW	59,670-234-51	W1LHE	43,475-179-47
W1ODW	58,800-245-48	W2QUM	43,200-216-40
W2COU	58,000-225-50	W3NOB	43,000-200-43

\* W1WPR, ops.

### 'PHONE

W4NYN	31,500-140-45	W2MHE	14,100-94-30
W8NOH	22,800-115-38	W9FTM	13,995-75-33
W4FV	20,786-102-38	W4HUW	12,410-72-34
W6CHV	18,810-60-33	W7KWC	10,530-65-26
W6TGA	17,010-63-30	W2COU	10,500-68-35
W5DEJ	15,840-81-36	W8ZJM	8,820-57-28
W4SHJ	15,680-91-32	W8HOX	8,620-60-26
W9IQY	15,390-81-38	W9PHR	7,140-51-28
W3MLY	15,015-91-33	W8MCC	7,105-49-29
W2ZVW	14,960-81-34	W2ATE	7,090-59-24
W9KDV	14,700-84-38	W3LXE	6,500-60-26

## NATIONAL CALLING AND EMERGENCY FREQUENCIES

### C. W.

3550 kc. 14,050 kc. 3875 kc. 14,225 kc.  
7100 kc. 28,100 kc. 7250 kc. 29,640 kc.

### 'PHONE

During periods of communications emergency these channels will be monitored for emergency traffic. At other times, these frequencies can be used as general calling frequencies to expedite general traffic movement between amateur stations. Emergency traffic has precedence. After contact has been made the frequency should be vacated immediately to accommodate other callers.

The following are the National Calling and Emergency Frequencies for Canada: c.w.—3535, 7050, 14,060; 'phone—3815, 14,160 kc., 28,250 kc.

# Station Activities

• All operating amateurs are invited to report to the SCM on the first of each month, covering station activities for the preceding month. Radio Club news is also desired by SCMs for inclusion in these columns. The addresses of all SCMs will be found on page 6.

## ATLANTIC DIVISION

**EASTERN PENNSYLVANIA**—SCM, John H. DuBois, W3BXE—SEC: IGW, RMs: AXA, BIP, PAM: PYP, E. Pa. Nets: 3610, 3915 kc. On Jan. 31st at Fogelsville, an AREC/e.d. meeting was held, attended by approximately 25 officials and their families. Highlights of this successful get-together included introduction of ECs, new emergency net organization, present Pa. e.d. system and policies. New officers of the Frankford RC for 1953 are as follows: LEZ, pres.; IXN, vice-pres.; BES, secy.-treas., KT activities mgr. On Jan. 25th, officials of Pa. C.D. Council witnessed an on-the-air demonstration of Philadelphia's e.d. communications truck. ADE represented Pennsylvania in the Governors-to-President Relay held Jan. 19th. Traffic: (Jan.) W3BIP 106, BFF 60, PDJ 55, AXA 48, DUI 42 AD 32, ADE 27, ELI 22, NOK 19, OML 4, PYY 4, CDT 2, (Dec.) W3IGW 156, QIZ 71, CHU 13, BE3 3, (Nov.) W3IGW 144, (Oct.) W3IGW 85.

**MARYLAND-DELAWARE-DISTRICT OF COLUMBIA**—SCM, James W. John, W3OMN—PWB, Civil Defense Radio Officer for the District of Columbia, reports RACES plan for D. C. has been approved by FCCA and FCC. This was the first RACES plan approved in the country. RGX and 4NTZ presented RTMA, at their Feb. 3rd meeting in New York City, with the problems encountered in TVI and by TVI Committees. Newly-elected officers of the Aberdeen Proving Ground Radio Society are UCR, pres.; LDD, vice-pres.; TFQ, secy.-treas.; ARDT, station manager; and 6DTR, station trustee. LJV is completing a 100-watt rig with handpans coils and a BC-221 as VFO. HC originated GPR message for Delaware and JE originated the same for Maryland, QZC had his antenna cut down by the telephone company but is working out FB by using a radiator. QCB is QNI on ESN and S8N Nets. PVRC had its annual dinner meeting with the Frankford Radio Club on Jan. 17th at the New Colonial Hotel in D. C. Sixty members of both clubs, plus 91OP, had an FB time. The Washington Mobile Club has started a club publication which is called *Radio Noise*. CDQ made a broadcast on V.O.A. with QOS regarding the Governors-to-President Relay. Twenty-two stations in the area received messages from 47 Governors in the GPR. The Washington Radio Club discussed the new ruling by FCC at its Jan. 10th meeting. On Jan. 12th the Chesapeake Amateur Radio Club held its election of officers and E. L. Crosby demonstrated "Infra Red Signaling." On Jan. 26th TLI's topic was "Some Trick Circuits and Subminiature Components." The Baltimore Amateur Radio Club meeting of Jan. 5th covered c.w. procedure by MWD. The Jan. 19th meeting was "Gadget, Hint, and Kink Night." Dr. Marshall, of Public Health Service, talked about "Brain Waves" to the Rock Creek Amateur Radio Assn. on Jan. 23rd. PZK held a meter calibration night for RCARA on Jan. 9th. Traffic: W3COK 114, JE 112, QZC 84, QCB 39, HC 27, NNX 20, MCD 12, RJA 11, JHW 8, FQB 4, PRT 2.

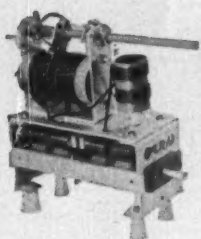
**SOUTHERN NEW JERSEY**—SCM, Lloyd L. Gainey, W2UCV—SEC: K2BG. The 2-meter band sounded like 75 during the Contest. GSG has moved over the river and is operating portable 3 with his Viking. WGH spent the holidays at home on leave from the Air Corps. KHW read a plug to collect the V.H.F. Sweepstakes scores from all the SJRA members. The Hamilton Township Radio Assn. elected the following officials: Larry Lloyd, pres.; CEH, vice-pres.; LSS, secy.; RMJ, treas.; Arthur Copestake, agt. at arms; ASQ, board member. Congrats are due KJV and EVS on dropping the "N". K2BG is moving up to 2 meters for a splash. After many years with a bug this will be Herb's first mike. The New Jersey Civil Defense Net meets Sun. at 7:00 P.M. on 3595.5 kc. This net will be the only state-wide net in operation during a e.d. emergency and it is sorely in need of additional operators. Warm up that key and call in; the speed will be held down. ZI handled the GPR message again this year and did his usual fine job. HAZ received his DXCC certificate after many evenings of

hard work. UCV is sporting a well-modulated signal on 75 meters with his new Viking. EFM is taking a stab at 2 meters with a nice signal. FXT, with a new transmitter and receiver, is all ready for 75 meters. Traffic: K2BG 215, W2RG 90, ZI 15, ZQ 5, ASG 2, HAZ 2.

**WESTERN NEW YORK**—SCM, Edward G. Graf, W2BJV—SEC: UTH, RM: RUF, PAM: GSS, NYS meets 3615 kc. 7 and 10 P.M.; 3980 kc. 6:30 P.M. and Sun. 8:30 A.M. NYSB is on 3595 kc. at 8 P.M. NYSB is on 3599.5 kc. and 3993 kc. at 9 A.M. Sun.; also on 3599.5 kc. at 7:30 P.M. Tues. and Thurs. QNA is on 160 meters with 75 watts. WN2NHV visited ORI. IPC worked VE2AEV, the Mal Atlic Exp. Force. CEZ is in the Vets Hospital at Buffalo. QHH worked EI and G on 160 meters with single 616 and worked FR7ZA on 14 Mc. for the 217th country with 35 watts. CPN has a new antenna farm. The RAWNY held its annual auction. GTI was picked to send the QTC from the Governor of New York to the President. The Black River Valley ARC now is affiliated with ARRL. Officers are YQQ, pres.; KN2APW, secy.-treas. GHS is instructing friends so they can take the Novice Class exams. QLI is on s.a.b. with WE357B at a kw. New officers of the Lockport ARC are ZOC, pres.; ALR, vice-pres.; KLI, secy.; EHO, treas. UTH and QY visited the Lockport Radio Club; the SEC discussed AREC work in conjunction with c.d. The C.D. Net on 3599.5 kc. now handles ARRL and routine traffic. QLI has Morrow converter in the car and 10-meter rig with 2E26 final. New officers of the Corning Radio Club are UMJ, pres.; YIY, vice-pres.; QLI, act. dir. QAA is building 'scope, audio oscillator, and s.a.b. rig. UXP has sixteen-element beam on 2 meters. PPA and VLL are on 2 meters. RJY is on 10-meter n.f.m. with a kw. NYS C.W. didn't miss a night during 1952. S8CW, manager of EAN, reports that ZRN was tops in attendance with only two misses in 1952 and that this attendance mark was due to the faithful representation of NYS members. GHS is on 80 meters with 10 watts and random-length antenna. An NYSS Net certificate has been issued to HKA. Appointments renewed: QNA, UYG, RXW, and PAN as OPS; UYG and KEL as OBS; DYF as OES; COU as OBS; GHU, CFY, and QY as EC. New appointees: MSF as OO and OBS. BFI is active again after an absence of 25 years. ZHB has a 5-over-5 on 2 meters. RTB and TKY have twelve-element beams on 2, ACO, TVR, S8L, DNE, RJL, FMX, HKO, WUW, and FDD, of Utica, attended the Hudson Division Convention. New calls in Utica are BRF and HQZ. VMN showed composite 2-meter gear at the Utica meeting and RJL, with DNE assisting, explained grid-dip meter technique. Traffic: (Jan.) W2BTB 2923, ZOL 726, RUF 631, OE 110, QAA 94, COU 87, SVY 55, KEL 46, RUT 45, ZRC 45, IFF 29, HKA 24, CPN 23, CYD 20, F2B 14, RJJ 13, PYC 12, K2DGB 11, W2WU 11, ZHU 7, QLI 5, KN2CBM 2, W2GHS 1, (Dec.) K2DGB 28, W2WU 9, HKA 6.

**WESTERN PENNSYLVANIA**—SCM, Ernest J. Hlinsky, W3KWL—RMs: GEG, NUG, PAM: AER, New appointees are AEV as OO, Class III, RSB as OPS, and KWL as OES. Up Erie way, QN reports that there are 29 AREC members, 6 mobile units and 4 emergency radio units. CNREQ, better known as 3LFX, returned for a visit with the old gang. In tribute to the late SLM's enthusiastic interest in amateur radio his parents have turned over his station to the Radio Association of Erie as a permanent memorial to their son. A3NQA has been appointed as Pennsylvania Director of the MARS. LKJ, MED, NXX, NQJ, QDE, OBE, and PIE are hitting it hard on Able and Baker 75 phone nets. The Bucktail Amateur Radio Club tells us that the McKean County Net on 3525 kc. at 9:00 A.M. Sun. has been fairly active. IIX, club correspondent, can be reached by writing to him care of Bucktail Amateur Radio Club, Emporium, Pa. The Horseshoe Radio Club is active. Looks like LJQ is back on 2 meters. LGD is working DX on 80 meters with low-power rig. Officers of the WPARCC are GEG, pres.; MPO, vice-chairman; NCD, secy.; and OD, treas. Club interest in holding a Division Convention is needed. Send a representative to the WPARCC at each meeting, learn the facts, and give your suggestions or comments. Incidentally, delegates from the ATA to the WPARCC are RFX, OMA, and OVM. The Amateurs Transmitters Association (ATA) wishes to announce that as part of its monthly program Phil Rand and his TVI reduction demonstration will be held in the Allegheny High School Auditorium on May 1st. The public is welcome; no charge. KWH, the Steel City Amateur Radio Club station, was going full blast during the recent V.H.F. Contest. Delegates from SCARC to the WPARCC are MTP, MPO, NQJ, OMY, NKM, and RIK. RSB says his audio bothers Channel 6. KNQ says his indoor antenna

(Continued on page 84)



A FAIRLY WELL KNOWN and popular tank circuit, the MB-40L, was recently mentioned in several transmitter articles. One of these, by George Grammer, described a transmitter using a Pi network in the plate circuit and an MB-40L tank in the grid circuit. However, one complaint George had was that obtaining constant grid drive over all bands from a low impedance line was difficult and might require some compromise.

Fortunately, we at National had already anticipated the need for a variable coupling system and were in the process of adding a swinging link to the MB-40L when the article by George Grammer was printed.

This new, more flexible model is called the MB-40SL and it is now in production. The link is electrostatically shielded and in the normal installation is completely adjustable from the front panel. The new tank duplicates the electrical performance of the MB-40L and can be used in the same type of installations. These include final tank assembly, grid tank, push-pull or single ended, or interstage tuning with capacity coupling. The tank tunes through 80, 40, 20, 15, 11 and 10 meters without switching or coil changing. You can see how this will encourage operation in more than just the favorite band where the rig happens to be all tuned up.

Although the MB-40SL was originally intended for operation in the grid circuit of a medium to high power transmitter, there are other applications of equal value such as the final tank in that new Field Day rig or the low power standby emergency transmitter.

Another application that frequently arises is use as a multi-band antenna tuner. In this regard, the MB-40SL can be used anywhere that conventional tuned circuits can be used, provided that proper loading of the tank by the antenna system is obtained. In any antenna tuner this condition must be satisfied to prevent the loss of power in the tuner.

The MB-40SL should be used with low impedance tubes for best results. Tubes that operate with 300 to 400 volts on the plate are the best bet. Much greater efficiency will result with the use of a tube operated at 400 volts drawing 100 ma. than with one operated at 600 volts at 65 ma. In addition, the chance of condenser arc-over is much greater with the 600 volt supply than with the 400 volt supply. When too high a supply voltage is used, the unloaded current will be excessively high.

The MB-40SL provides a compact flexible unit that can be entirely front panel operated. Don't forget this when planning your new rig.

WALTER T. HYNES



(Continued from page 88)

does fairly well. AJN wonders if he is the first U. S. station to work a VE2 on 40-meter 'phone shortly after the Canadians were authorized 'phone operation on that band. AER says 20 meters is very erratic. LXE piled up a nice 'phone score in the 88 Contest. CA did a nice job of handling messages in the Governors-to-President Relay. Traffic: (Jan.) W3NCD 80, NUG 65, UHN 60, CA 33, KUN 26, NRE 25, LXE 8, AER 7, (Dec.) W3NCD 25, KUN 19, AER 9, MIZ 6, KNQ 4.

## CENTRAL DIVISION

**ILLINOIS**—SCM, H. F. Lund, W9KQL—Section Nets: ILN (c.w.) 3515 kc.; IEN (phone) 3940 kc. SEC: HOA. PAM: UQT. RM: BUF. A. B. Brand, HOA, 1211 Harlem, Rockford, is the new SEC for this section. This will effectively tie the amateur service to State c.d. work. QIZ has moved up to Asst. Director. Chicago Area Radio Club Council officers for '53 are AVH, chairman; GGN, vice-chairman; GVO, secy.; VEZ, treas. The Council is looking forward to a successful year and expects many additional clubs in the UP membership. PYT has replaced FHP as c.d. director for the North Suburban Club; the club station, UXB, now is active. New club officers are OLU, pres.; INN, vice-pres.; QBJ, secy.; JZN, treas. GQI is playing nursemaid to the electronic brain at U. of I. PTZ reports into ILN from YH at Urbana and keeps regular sked with his Dad, STZ, while at college. He says it is better than at Ripon as Dad can use his 200-watt rig. OSN and LX are recuperating nicely from tummy ailments. QBJ, OLU, WYO, and ZPK are s.a.s.ing. State CD Headquarters is planning to purchase a rig for use in emergencies. NN has given up chasing DX on 20 meters and has settled down on 40-meter c.w. JMG got so enthused selling equipment that he forgot to keep enough to remain on the air. OS is enjoying his new Globe King and finds the whole world at his doorstep with any TVI. BVY has constructed new antenna coupler to get more sound into the fire. NQO has moved to Wheaton. YLX and CEF are learning the ropes at State Police station KSB47 as auxiliary operators. Bloomington Club c.d. committee consists of 8XL, BFZ, and KYW. IMD has retired from the railroad and is living in Florida. GVO is building a new rig ending up with 6146. 6CIW/9 inherited an electronic key from FKX. QHB put a Viking II together. BVY is now Tech. Cl. and has a TR-75. ICF reports 10 meters still dead. JAC has left Scott AFB for an overseas QTH. GUW is rebuilding his kw. rig. KFX constructed a new mobile rig for 10, 20, and 75 meters. HUX debugged his bandwidth exciter in time for the DX Contest. SIE, QCQ, QAB, and OWP received Ad. Cl. tickets. The Midway Radio Club (Zion) and Lake County Club (Waukegan) combined facilities to supply communication for the Boy Scout "Klondike Derby" from Zion to Waukegan. Active mobiles were DOR, DTE, VOM, GDV, OSY, NQF, FVS, and 4CVO/9. 4CVO/9 spent some time in Wyoming renewing acquaintances and picked up in person certain rare Wyoming QSLs. SOC is seaward bound via boat camp at Great Lakes. OR gets TVI from a local anti-aircraft radar station. New officers of the Bloomington Club are ZST, pres.; JPR, vice-pres.; CFV, secy.; 8XL, board of dir. The Club has a new receiver and is building a transmitter. Traffic: (Jan.) W9SW 305, TBI 150, YLX 141, 8XL 134, LXJ 80, W6CIB/9 61, W9KQL 58, CEF 51, CTZ 21, W4CVO/9 15, W9AND 10, FRP 6, NN 5, BGN 1, (Dec.) W9KMO 70, NN 8.

**INDIANA**—SCM, Clifford C. McGuyer, WDGA—SKP is a telegraph operator for the Nickel Plate Railroad. RDJ is TVI-proofing his Viking. DKR has a new 'scope. VRZ is new in Frankfort and has TBS-50. OLN has new p.p. 616 oscillator running 80 watts. MHM gave a talk on the grid-dippler to the Tri-City RC. ARH is back on 75 meters with a new QTH. DOK and RBX have new Vikings. PPS has his break-in system perfected. HLY is working on TVI. DRJ devotes lots of his time to the Calumet Area Emergency Net. KRJ and TBM were in the hospital. PQA had the flu. NZZ says the Arctic traffic is bigger and better than ever. EUC has vertical for 7 Mc. KLR has worked ten states on 144 Mc. NTR is new OPS. SKP, HLY, and OWZ received QEN certificates. JVF is back on 28 Mc. FYM works 160 with a Command transmitter. CUD had a nice write-up in the Indianapolis Star. EVR has moved to W6-Land. NH again was heard in New Zealand on 160. New officers of the Kokomo ARC are DKR, pres.; PXZ, vice-pres.; QBD, secy.-treas. SNF has new 750-watt rig. MIF has p.p. 814s for 7-Mc. 'phone. KXB vacationed in Florida. OFD has new s.a.s. exciter. DNA and JEX work at broadcast stations in South Bend. HZL has his Ad. Cl. license. KRJ has new rig with 800 watts. CYQ and HNS visited TG. QLW is new RM. MVZ of the IRCC announces a Novice W5 Contest. See MVZ for details. JBQ reports RFN traffic as 51. PMT has been comm. mgr. for the FWRC for 6 years. The annual banquet of the FWRC was attended by 117. FMJ spoke on Radio Prior to 1926. TNP has new 8X-75. BKJ reports IFN traffic as 169. New OBS are RDJ, OLN, and EUC. NTR is experimenting with Selenium preparatory to installing a 10-over-20. FFE has 22 countries on 7 Mc. UOW has new grid-dipper. PPO recently was married. HQF has vertical for 7-Mc. DX and visited NN. JUJ reports QIN traffic

as 765. New OBS are HQF, STW, RBX, OWZ, and SKP. ZIB, WBA, KRJ, LZL, and GUX assisted in the attempt to locate FPI and his aircraft. OHX, SVC, and PPO received their Gen. Cl. licenses. TT reports the 147.3-Mc. net in Indianapolis is operating. QAV is building a new shack. FJI has new Monitore. QJR is building 150-watt rig. POF has new VFO and IC-221. NJR is TVI-proofing his rig. UNT has emergency receiver and transmitter for 7 Mc. Traffic: (Jan.) W9UJ 1502, NZZ 527, YWE 313, WWT 218, TT 217, QLW 174, TG 142, BKJ 98, JBQ 63, CMT 49, OLN 32, SKP 30, DGA 27, DKR 25, FSA 23, QID 22, WBA 22, KDV 19, FYM 17, DOK 16, NTA 16, BDP 14, PMT 14, ZIB 14, HQF 12, IFR 10, KLR 6, NTR 5, NJR 2, RDJ 2, (Dec.) W9WBA 45, NXU 23, GUX 20, IFR 5. **WISCONSIN**—SCM, Reno W. Goetsch, W9HQM—SEC: OVO. PAM: ERI. RM: IQW. SFL. 'Phone Net (BEN) 3950 kc., 6 p.m. daily. C.W. Net (WIN) 3625 kc., 7 p.m. daily; slow speed 6:30 p.m. Mon.-Fri. Mobile and c.d. frequency, 29,620 kc. CXY received CAN net certificate. UCR was designated as Acting NCS of WIN slow net for February by SFL. Licensed operators at ODD include FCK, IDW, JGG, KMO, LSK, OOA, ORQ, and W9N9. RHP, SFL, WFP, and WKJ are interested in schedules with other schools. SDK had a score of 49,750 in the CD Party. FCF is the proud owner of a Viking II. HHD is working on a 75-meter vertical of empty juice cans! HHD has a squeel circuit on the receiver for monitoring net frequency. Business will take VLL to Detroit for 3 months. Winners of the MRAC achievement award for 1952 are GIL 1st, RKP 2nd, and BSR 3rd. In the Novice competition we find WN9VBZ 1st, HZD 2nd, and VOD 3rd. LVR is back in Milwaukee. FDX collected some new wallpaper in the form of Extra Class amateur, 1st 'Phone, and 2nd Telegraph Commercial licenses. BEN net certificate was issued to QJB. WIN net certificates were issued to CXY, FCF, and ERW. The FLARC, at Madison, elected RBL, pres.; TRU, vice-pres.; ONE, secy.; ONM, treas.; and BVX, TVH, and UTV, directors. The North Eastern Wisconsin V.I.E. Club is new in Green Bay with 144-Mc. rigs under construction. KXK received his Old Timers certificate. New appointees: GFL as OES, FUS as OPS, PVH as ORS, AKY as EC. The appointment of OVO as SEC has been renewed. C U all at the annual WVRA Hamfest in Wausau Apr. 18th. Section meeting starts at 7 p.m. Traffic: W9ESJ 146, CXY 121, IQW 70, DR 54, UCR 47, ODD 29, OTL 28, SFL 28, SDK 19, FCF 12, EIZ 11, HDV 11, VLL 9, ERW 7, OVO 4, CEF 3, FDX 2.

## DAKOTA DIVISION

**SOUTH DAKOTA**—SCM, J. W. Sikorski, W0RRN—SEC: GCP. RM: OLB. PAM: UVL. Ex-5PKP now is 9LRN at Rapid City AFB, where he is a captain in the USAF. He is building an 813 final and now is working 40 meters. The Prairie Dog ARC is publishing a club bulletin. The club divided into two groups and conducted a simulated emergency at this month's meeting. DTB, Centerville, has joined USNR. ZVV is working for KVV at Yankton. KVV, after an absence of many years, is building a new rig. GDE now is using Meissner 150B. A new call in Sioux Falls is W9NAB. K0FAL, Rapid City AFB, has been changed to K0FCR. TI is working 160-meter mobile. Two-meter enthusiasts will find a nightly 2-meter net operating in the northeast corner of the State at 2130 CST. Is there any other 2- or 6-meter activity in the State? After an absence of many years SMV is on 80 and 40 meters with 35 watts, and needs only Delaware for WAS in two months of operation. Black Hills ARC: How about station activities? Traffic: (Jan.) W0UUL 103, OLB 91, PHR 54, EHO 34, WISWX/9 14, K0FAL 9, (Dec.) W0FAL 49, WISWX/9 31.

**MINNESOTA**—SCM, Charles M. Bove, W0MXC—Asst. SCM: Jerry Walter, 0KYE. SEC: BOL. RM: DQI. RPT. PAM: UCY. HEO. A new club known as the St. Johns Radio Club, located at Collegeville, Minn., has applied for membership in the ARRL. Code classes are held five evenings per week at the club rooms at St. Johns University. For information call the president, John Theisen. 0BP1, of Wadena, or C. T. Keogh, at Collegeville. All Novices are urged to check into the Minnesota Junior Net which meets daily except Sun. at 1800 CST on 3600 kc. Single side-band is progressing in the State. L1W, TLE, DXZ, and ATD can be heard just about every evening on the high end of 75 meters. Prospective single side-banders are AJS, BWF, BJR, BPK, AUS, and HXR. Two new Novices in St. Paul are W9NLSH and LQF. The MSN now has a roll call of 31 members. I think DQI is doing a swell job. Our Director, PHR, has appointed FDS as Asst. Director. JNC ran up quite a score during the last CD Party, 55,700 points. K0EAA (# soon will be back on the West Coast. BBA has a Novice class now going with eight students. UCY now has a new converter for 2 meters so will be QRming this

(Continued on page 90)

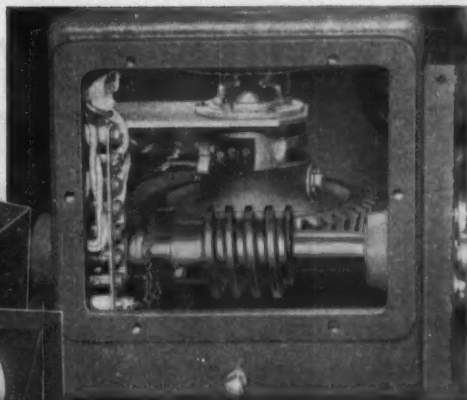
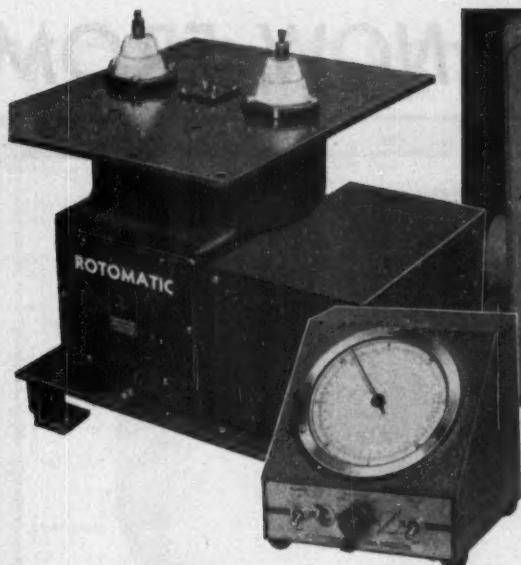


Photo showing worm gear assembly and selsyn motor.

138-112—for 115 volt 60 cycle power.

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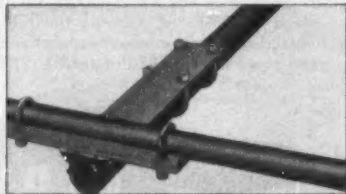
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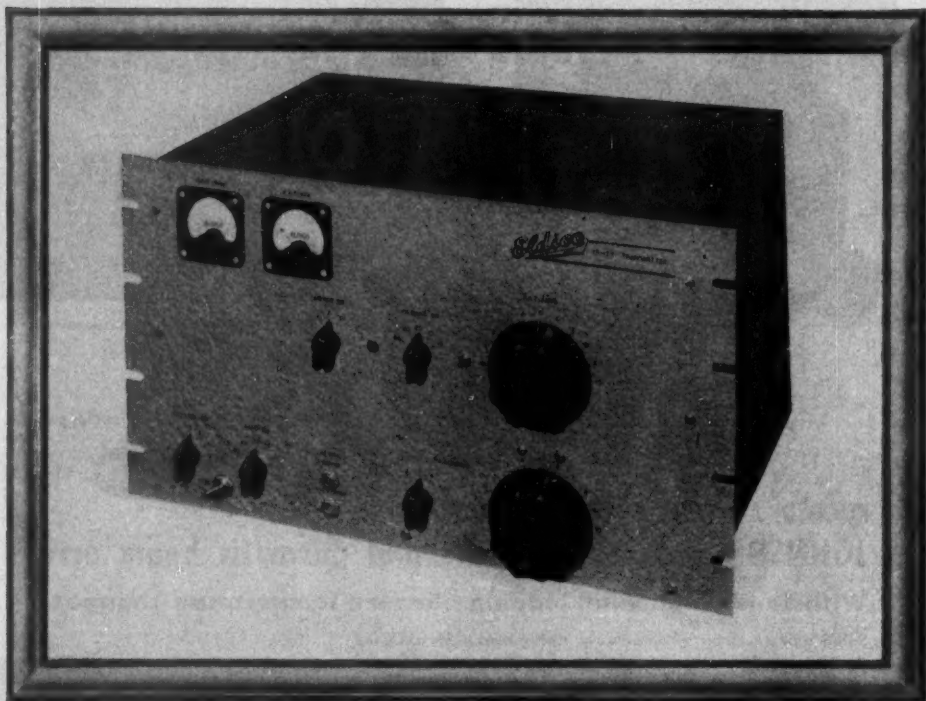


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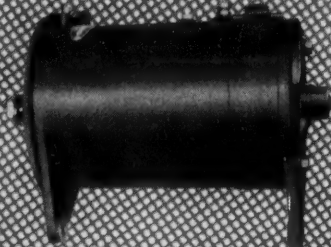
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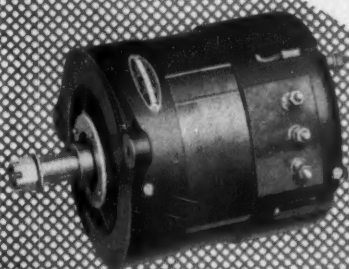
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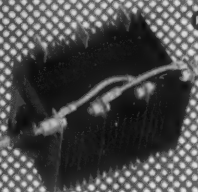
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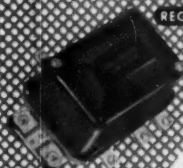
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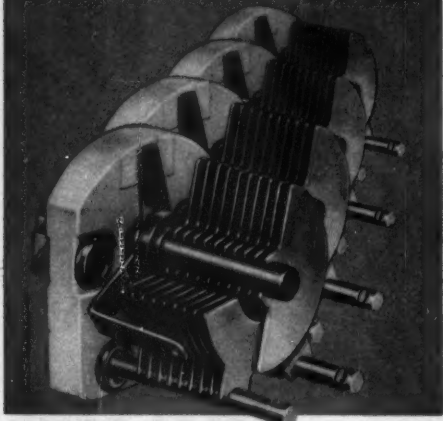
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(Continued from page 84)

band. The Mobile Amateur Radio Corps now has a 1-kw. rig on 75 and 80 meters and plans to use it as a control station for the 75-meter mobile rigs. The Mobile Corps put on one of the largest simulated emergencies in the State called "Operation Crystal." This operation covered all of Hennepin County. The Civil Air Patrol, under the control of Col. Webber, supplied about thirty planes to act as a bomber squadron. The local fire departments and civil defense also participated. Traffic: W01TQ 456, QVZ 176, UCV 154, FDS 142, DQL 133, RPT 128, SWB 111, CGK 104, ZTB 71, GGQ 41, JIE 38, HFY 33, FIT 32, TJA 26, RXL 24, BUO 23, CID 23, GTX 21, K6EA/6 20, W9BWM 17, CQY 16, CXM 16, BQK 14, MXC 12, DYD 11.

### DELTA DIVISION

**ARKANSAS**—SCM, Fred Ward, W5LUX—Thanks for the reports, fellows. EA has resigned as SEC so that he will be free to move to a broadcast job. MRD is new SEC. AY handled the Governors-to-President message in good shape. We all were grieved to learn of the passing of UAA. WUH says the boys at Searcy are organizing a club and QIP reports the ASTC Amateur Radio Club has a new call for the club station, YUZ. The rig is p.p. 813c, 900 watts. PHP won the G. E. Award as the outstanding amateur of 1952 for his fine service during the Judsonia emergency. PZB renewed his appointment as EC for Fort Smith, HPL renewed as EC for Sebastian County, and RWJ, although still having some TVI, has renewed his EC and RM appointments. We are indebted to W5WVD and the Little Rock Amrad Club for putting the license-tag bill into the Legislature. WUH and YHV claim the Novice QSO record of 5 hours and 4 minutes. MRD has a new Viking rig for the jr. operator. MRD is starting code practice transmissions. Times and frequency will be announced. Traffic: W5VN 23, EA 16, LUX 11.

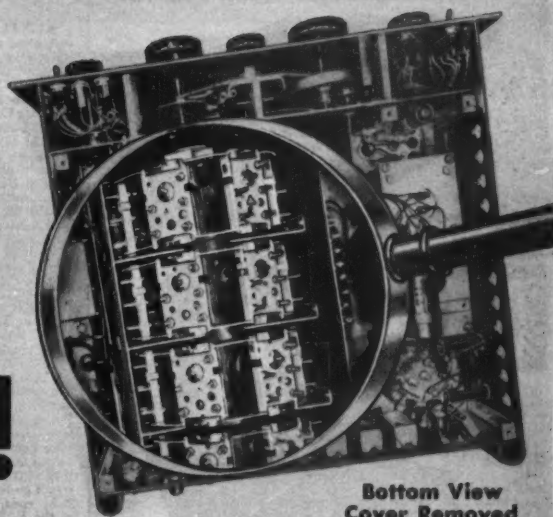
**LOUISIANA**—SCM, Robert E. Barr, W5GHF—FTU now is portable W7 in Idaho and is an operator at K7FBL. FTU has been quite a rolling stone, having formerly been JAZCV, AIIAY, JAZAK, W5EVG, W4EFG, and W6WMF. TRQ, the latest appointee to the ORS ranks in Louisiana, is a newcomer to the Crawfish Net on 40 meters. NG still appeals for more activity on the 40-meter state nets, and asks that you contact him. SRV uses 813 final from Baton Rouge with good results. IDK and KUZ again are active on 75 meters from West Monroe. GWX is in Springhill on seismic exploration work. MBE has returned to the air at Fishville. K5FBI handles 3.9-Mc. traffic for Barksdale AFB. QH is up to his neck in TV developments and finds little time for hamming. TRQ now is running 125 watts to a pair of 807s on all bands, c.w. UZA is finding plenty of bugs in the new big rig but will have a nice set-up when it's finished. BMM is the hot-shot golfer from the ham ranks. Any challengers? The poor conditions on 14 Me. have chased IVF back to the 75-meter 'phone band. CEW gets that rare DX consistently. KTD is the mobile authority around Shreveport. NMS puts a nice signal out on mobile 75 from Alexandria. The Pelican Net is open to suggestions as to how to keep up activity throughout the remaining bad years of the low ebb of the sunspot cycle. Traffic: W5NG 245, TRQ 3.

**MISSISSIPPI**—SCM, Norman B. Feehan, W5JHS—The Meridian Radio Amateur Club is active again with the following officers: DNV, pres.; DEJ, secy. DEJ ran up a very nice score in the CD Contest. RUT is stationed at Sioux City, Iowa, and says he is looking forward to the day when he will be back in Dixie again. HRX is attending Clark College in Newton, Miss. Look for him on 40 meters. The Magnolia Emergency Net has changed its time to each Sunday at 1:30 P.M. CST on 3870 kc. BZG, PFC, RIM, RLP, 88K, TAB, UTL, WLY, VMC, VQE, JHS, and TXX can be found on the Mississippi MARS Net daily except Sunday at 8:45 A.M. CST on 4080 kc. Your SEC, Jack Martin, W5YOZ, P.O. Box 990, Gulfport, would like each EC in the State to write him so he can become better acquainted and get his books in shape. Jack would like to hear from all who are interested in becoming EC. Traffic: K5FBB 341, W5JHS 74, RIM 44.

**TENNESSEE**—SCM, Mark M. Bowelle, W4CXY/WLQ—SEC: NJE. RM: AGC. PAM: PFP. It is with regret that we must tell the gang that AEE has found his new job as state RO taking up all his spare time and has resigned as SEC to be replaced by NJE. Mac will have the help of VJX and will carry on the good work that Harry has been doing. PMR got himself a free train ride out of the recent snow-storm emergency work and the gang who helped with dispatching Southern Ry. trains got a nice write-up in that firm's paper. Skip on 80 meters has made the going rough for both the c.w. and 'phone nets, with the Donald Ducks helping to make the going worse for the 'phone boys. However, members of both nets, to their eternal credit, have been sticking with it and doing a fine job. The number of traffic reports this month is the best yet, in spite of the bad conditions. Please keep it up, gang. Traffic: W4PL 1525, W1H 287, PFP 266, IWV 126, FHP 110, WAX 72, VJX 67, NJE 66, SCF 66, PHQ 64, CXY 52, RMJ 48, OGG 45, WQW 44, IIB 36, TYU 29, FLW 25, FCU 6, PMR 6.

(Continued on page 92)

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Coil assemblies are mounted on the turret. Turning the band selector switch to any one of the six frequency bands places the required coils immediately in their correct positions. This arrangement increases receiver stability, provides uniform maximum performance from band to band, and simplifies servicing.

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### GREAT LAKES DIVISION

KENTUCKY—SCM, Ivan C. Kelly, WATUT—Bad operating conditions and poor DX prospects made for lots of inactivity in and about Kentucky during January. Building and planning meets seem to have taken the place of activity. JUI now is a member of the Quarter Century Wireless Club; he still can hit the nose in frequency measuring as our only Class I OO. JCN splits time ragchewing and dreaming of Lake Cumberland fishing. #MWV4, the main operator at K4WBG, is getting Harvey Wells mobile going on all bands. TAV reports meeting three regular nets and seven out-of-state net schedules. Kentucky would be lost without Marty. CDA proudly reports Delaware and now needs but two more for his WAS. URF was busy helping to prepare for the big exhibit of the University of Louisville Ham Club on Engineer Day. He also found time to build all-band exciter and new antenna-tuner system for all bands. UWR is back in the fold again. JFP is fixed portable in Florida. The more reports you fellows send in the better this report will be. Traffic: W4TAV 349, WHC 119, K4WBG 56, W4JCN 21, PXX 16, CDA 11, JUI 3, URF 1.

MICHIGAN—SCM, Fabian T. McAllister, W8HKT—Aunt. SCMs: J. R. Beljan, 88CW; R. B. Cooper, 8AQA; M. C. Wille, 8CPB. SEC: GJH. RMs: YKC, UKV. New appointments: EH as EC for Allegan County. I want to thank all of you fellows for the splendid support you gave me in nominating me as SCM. I assure you that the same democratic principles and ideals so well preserved by our former SCMs will be retained during my term of office. Let us all work together to keep amateur radio in this section truly "of, by, and for the amateur." Just as it required your help to put me into this office, so it will take your help to put the job over. It is no accident that the Michigan section ranks as one of the leading traffic sections of the country. You fellows have worked hard to put it there, and with your continued help we will keep it there. New officers of the Edison Radio Club are AW, pres: VRB, vice-pres: MTH, secy-treas: EQY, act. mgr. ZWM is sporting a new BC-610. The Cherryland Radio Club has moved into new quarters in the VFW Hall. NUL is using dimmer-switch to control his transmitter relays—nice footwork, nice headwork. ILP took Ex. Cl. exam on Jan. 14th and got the coveted certificate on Feb. 3rd. The Niles-Buchanan Club staged a very nice meeting for all hams in the area and we met fellows we hadn't seen in years. The ARRL movie proved interesting, too. Congratulations, fellows, on a good job, excellently handled. The Berrien County gang is operating a beginner's traffic net in the Novice band. All are welcome, on 3735 kc. at 2:00 p.m. Sundays. Traffic: (Jan.) W8RJC 665, NZZ 569, SCW 140, ILP 112, NOH 107, KLK 105, RTN 103, ELW 88, QIX 84, IKX 67, SPF 62, URM 57, 655, NZZ 569, SCW 140, ILP 112, NOH 107, ZLK 105, RTN 103, ELW 88, QIX 84, IKX 67, SPF 62, URM 57, FGB 56, JYJ 55, GTM 52, IQJ 51, IV 43, FX 30, SIF 29, DLZ 27, CUL 25, ZWM 25, CYL 24, HKT 22, WVL 21, UKV 20, NOL 19, AUD 17, KSL 8, GJB 7, ENX 6, TIC 6, EGI 5, THG 5, JUQ 1. (Dec.) W8WNT 18, FBV 10.

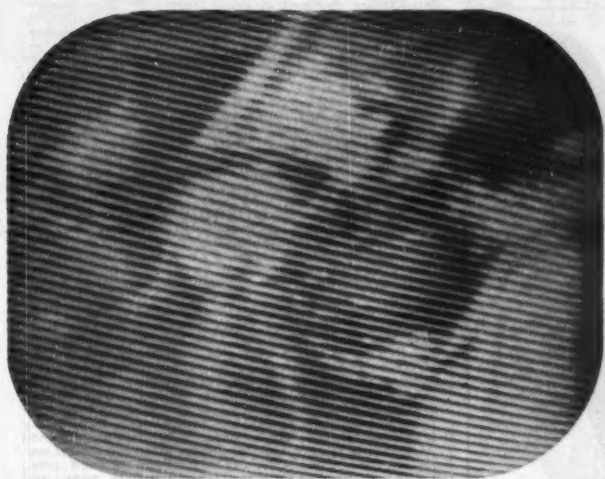
### FIRST ANNUAL OHIO INTRASTATE QSO PARTY APRIL 18-19

The Ohio Council of Amateur Radio Clubs will sponsor a QSO party, open to all Ohio amateurs, which will be held April 18-19, 1953, from 6:00 p.m. EST Saturday until 6:00 p.m. EST Sunday. All Ohio amateurs are urged to participate in this affair and to submit their logs to the contest manager.

Any and all amateur bands and any mode of emission may be used. There will be no power restrictions. Scoring: multiply the number of Ohio stations worked by the number of Ohio counties contacted. Each station may be worked but once regardless of band or mode of emission used. Logs should include call signs of stations worked, time, date, signal reports sent and received and the county in which the station is located. Operation about the following frequencies is recommended: 3550, 3740, 3860, 7100, and 7250. On the other bands, take your pick. The call "CQ Ohio" should be used on both 'phone and c.w. At least five appropriate certificates will be awarded to the highest scoring stations. Certificates will also be awarded to the Novices, the number of certificates being contingent upon the degree of activity.

All contest logs must be postmarked no later than May 1st, 1953, and should be sent to the contest manager, Hamlin King, W8EQN, 353 So. Arlington Ave., Springfield, Ohio.

OHIO—SCM, John E. Slinger, W8AJW—Aunt. SCMs: C. D. Hall, 8PUN, and J. Erickson, 8DAE. SEC: (Continued on page 94)



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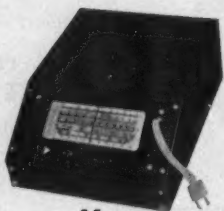
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UPB. PAM: PUN. RMs: DAE and PMJ. HNP is new EC for Lucas County. DAE is back home after a stay at University Hospital. On Jan. 17th. the OCARC met in Columbus. Topics discussed included Docket 10173, emergency work and message preambles. The OCARC Field Day Trophy was awarded to the Tuscarora Radio Club of Canan. The next meeting will be held April 11th, and on the following week end the OCARC Intrastate QSO Party will be held. PBX is in charge of c.d. activities in Indian Hill Village as per approval of the village council. RO has just worked his 48th state and recently received his OTC certificate. The BSWRA now meets at the Akron Municipal Airport; Newly-elected officers are FWA, pres.; HGI, vice-pres.; KDW, secy.; HJH, treas.; NYS and BFI, agts. at arms. DG has a new 100-watt rig for 15 meters. MDW, MGW, MFA, and MGM are new operators in Dayton. Recently-elected Fort Hamilton officers are HXB, pres.; IUW, vice-pres.; UFF, secy.; and UNW, treas. New licensees in the area are MDJ, MDY, and MDF, and HKK received his Extra Class license. DAD received his Extra Class license and WAS certificate. Our sympathies to BCQ, who recently lost his father. PVV is a newcomer to 22 Mc., with ULL about ready to go on. YPT, now in active service in the Far East, writes that he operated for awhile over KA2LD. He mentions that his dad, BUQ, received his OTC certificate and that his sister passed her Novice Class exam. YGR, TRC secy., states that he, along with HSW, IZQ, and HNP, have ready their two operating rooms at the Red Cross Hq. A Viking II transceiver will be used. UZJ soon will be back on the air with a new rig from a new location. OVG writes that the Dayton gang is going to town in their Hamvention preparations. Other Dayton items are that weekly classes for Novice and General applicants are being sponsored by the DARC, that the club membership is approaching the 300 mark, and that the musical-voiced ACE now is talking with his fingers with pronounced success on the DX bands. New QCEN officers are HJH, pres.; CQM, vice-pres.; 4TPZ, secy.; L. Dieselberg, treas. and SDJ, net manager. Cincy's Mike and Key tells us that WWG and MGF are quite the hotshots on 20-meter mobile and that the 144-Mc. gang is doing a swell job with code practice, twice nightly, at 2000 and 2300. The Shack Gossip out of Toledo says that BN now is on s.a.b., TLC's son is home on leave from the USAF, and KGI has a new 75A-3 receiver. The Columbus Carascope reports the following: JIX worked a ZL on 80, the boys associated with AREC, c.d., and CARCAP are doing a bang-up job, and the Jan. 9th meeting enjoyed a splendid turnout. What happened to the Springfield Q-5 this month? Before we forget, the Ohio State Journal and the Columbus Dispatch carried the text of Governor Lausche's message to President Eisenhower. The GPR was sent via YEW to 3QQS. APF, Franklin County EC, deserves a big hand for lining up the situation, including the favorable publicity. During January the Ohio boys went to town on BRN. RO attended 24 sessions and IB 10 to lead the Buckeye contingent. Traffic: (Jan.) W8FYO 344, RO 129, UPB 90, BN 75, LMB 75, DG 70, DAE 65, IB 66, PMJ 45, AL 40, YGR 34, EQN 29, JAR 21, WAV 21, CTZ 20, AJW 19, KFB 13, GZ 11, HXB 10, WE 8, ET 6, LCY 4, SRF 4, UZJ 4, TLW 1. (Dec.) W8BN 73, GZ 20, DZO 6, PBX 2, TLW 1.

## HUDSON DIVISION

EASTERN NEW YORK — SCM, Stephen J. Nenson, W2ILI — SEC: RTE. RMs: TYC, KBT, PAMs: JIG, K2CA. YOK is busy with new home. K2ACC is the temporary manager of our Section Novice Net (3716 kc.). UKA reports that a permanent manager will be selected soon. If interested in this net, contact UKA promptly so that your name can be included in the next bulletin and directory. IFF has a new Lysco 600 all-band exciter. Dave was awarded a Section Net certificate for activity on NYS. VDX and ZFL have been discharged from the Army. BTV is with WKNY part time. DVZ has moved to Dutchess County and is working for IBM. BSH has seven states to go on 3.5 Mc. for WAS. George is to be congratulated for his help to KNR CKS, BSD, and CKO, who recently received their tickets. It's nice to hear Helen, BNC, back on the nets these days. VP is QRL on NYSEPN. ZQV, a long-time member of AREC, has been appointed Schenectady County EC. GTI was designated to handle the Governor-to-President message. RTE has been appointed as our new SEC. Ted is considered an excellent choice for the post and he will be very active in the section. I am sure that he will receive full cooperation from all concerned. Plans for a section v.h.f. net are well under way. For information, please contact PCQ. Activity is an indication of a live section; a proud member will report his activity as well as keep his endorsement up to date. Are you a proud member? Appointments: RTE as SEC, ZQV as EC, MHE and MRQ as OBS, MRQ as OO, RTE as OPS and OES. The need for Official Observers is urgent. Inquire now. Traffic: (Jan.) W2TYC 175, EFU 71, MHE 56, ILI 55, AAO 40, IFF 29, BNC 24, CFU 22, KBT 16. (Dec.) W2WSS 124, IFF 60, LRW 49, BSH 13.

NEW YORK CITY AND LONG ISLAND — SCM, George V. Cooke, Jr., W2OBU — Asst. SCM: Harry Daniels, 2TUK. SEC: KTF. RM: VNJ. PAM: YBT. AREC/

(Continued on page 96)

# MALLORY HAM BULLETIN

## Power for Civil Defense Communications —from MALLORY Vibrapacks®

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c.d. activity is moving along with excellent results. JSV, Queens EC, reports the 2-meter net very active (25 net membership, 16 stations active average attendance). This net is strictly AREC—no c.d. affiliation yet. There is close cooperation with the Red Cross with a station installed at Flushing Hospital, one at Flushing Red Cross, and another ready for installation at Jamaica Red Cross. The 10-meter net has a minimum attendance of 9 stations with 20 mobiles participating in the c.d. group. Three new AREC registrants are KN2ARJ, BBO, and MWK. ZOS has received a Net Certificate for good attendance and effort in the 2-meter net. MEF and others are working on N.Y.C. RACES plan and coordinating c.d. city-wide. Twenty mobiles with 12 to 15 fixed stations are active each Thurs. night on 29.492 Mc. JHF, Asst. EC for Roosevelt, has AREC/c.d. activities under control and is equalling endeavors in other parts of Nassau County. New Official Mobile in Roosevelt is NRL. The NYC-LI Section 'Phone Net, YBT PAM, has increased skeds to Mon. and Thurs. at 2000 on 3910 kc. and invites all interested in handling traffic to join up. Many of the towns on the Island need coverage. The NYC-LI (NLI) Traffic Net bulletins are mighty fine reading. VNJ, the NLI Net RM, really is boosting activity with many additional BRAT awards going out to AEE, GP, IDK, IVS, LPI, and VNJ. Vse asks for stations in Queens and Staten Island to join up and handle some of the big loads of traffic. Appointment as ORS is open for those who participate. AEE and IDK are piling up nice traffic scores in the N. Y. slow-speed net. The ARC Newsletter of the Astoria Radio Club sure is newsworthy. EYP is heading up the Club's Field Day plans. Capt. Trenner, of MARS, gave a fine talk at the Nassau Club on MARS and c.d. activity. News from the New York Radio Club mentions JEC, OEU, HBQ, QZ, and K2BBC as new members. CMM got his Extra Class ticket the hard way. NSH made the Advanced Class just in time. New officers of the FLIRC for '53 are DKH, pres.; DVK, vice-pres.; QPQ, secy.; and OUG, treas. The North Nassau Radio Club received its affiliation charter. The Club meets the 2nd and 4th Tues. at the Roslyn High School. Visitors are welcome. WN2MBT is new in Center Moriches. OGX has been appointed OPS. LEO has received ORS appointment. BMK now is Official Observer WZG moved to Glen Oaks and worked a W6 with attic antenna the first time. The Brooklyn Radio Club elected the following officers: DDI, pres.; BMK, vice-pres.; ZRA, secy.; JSV, treas. DDI received his 25-w.p.m. certificate and sticker. DIC reports excellent results with vertical concentric antenna on 28.5 Mc. TUK got in the V.H.F. 88 with good results and states the Nassau Club had 30 participants making 6725 points and GLU, the club station, gaining a high score. The Lake Success Club, YKQ, piled up a good score in the V.H.F. Contest and announces the new station now is in operation on all bands. CSO is back on the DX bands after a long Naval sea training cruise. PF is studying a.s.b. techniques. Traffic: (Jan.) W2BO 510, LPI 264, VNJ 233, JZX 175, IVS 148, AEE 147, GP 73, EC 63, DIC 38, IDK 35, PF 31, GXC 27, OBU 25, OUX 18, BQM 8, JHQ 8, LEO 8, KFV 4, BMK 2, IRK 1. (Dec.) W2NSD/2 1683.

**NORTHERN NEW JERSEY**—SCM, Lloyd H. Manamon, W2VQR—SEC: NKD, PAM; CCS, RMS: WCL and NKD: NUL, Passaic County EC, announces the formation of a new county net on 29.410 Mc. 8:00 P.M. Thurs. JT, of Wayne Township, is NCS for the new net. All county stations are requested to call in whenever available. DXD is on 144 Mc. with AFSK. Monthly OO reports from TPJ, GVZ, and NIY show an increasing number of violations reported. This proves the value of the work the OOs are doing. EWL, mobile a.s.b., reports excellent DX. COT reports the Livingston RC is considering a club project involving a.s.b. exciter. CED is active in c.d. nets. EBR's new QTH is Upper Montclair. NIY renewed an old acquaintance with K2BZ after 12 years' absence from the Naval Academy. OUS still is working DX with 8 watts. WN2BBR now is General Class. While a Novice he worked 27 states with only 9 watts on 80 meters. NKD made BPL for December but word was received too late for inclusion in last month's report. BYS is on 80 meters with new 125-watt rig. Belleville RC has a new slate of officers: JUU, pres.; Art Astell, vice-pres.; JYW, secy. Belleville C.D. Net meets every Sun. at 10 A.M. on 29.6 Mc. New member stations are needed in the NJN, 3695 kc., daily. CCS still is looking for OPS candidates, and desires to start a 75-meter 'phone net in New Jersey to operate daily. Drop a card to CCS if interested. CUI is moving the shack into a new trailer. The Perth Amboy C.D. Council held a successful drill Jan. 31st. HIA was NCS at C.D. Hq. Area 7 mobile communications vehicle was utilized for the test. Other member stations of the local council assisting were GMY, UMZ, KAR, and IAH. CBT acted as monitor, checking on net procedures. All operations were on 147.15 Mc. EWZ recently completed his 11,000th QSO. ZPD has new mobile rig in the car. ESW is busy with Hawthorne c.d. mobilization tests. The Raritan Valley RC elected VPL, pres.; GUZ, vice-pres.; NQA, treas.; EKV, secy.; and UK, trustee. The Club meets the 1st and 3rd Mon. of each month at its club house in Middlebush. New members are BEV, HJD, JOE, FQN, HUZ, and Jim Martin, sr. FQN, the "Minter RACES" of Middlesex County and

(Continued on page 98)

# FREQUENCY CONTROL FOR MILITARY APPLICATION



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CR-16	AR23W	0.080 - 0.19999	-40° to +70°	± .01%
CR-18	BH6A	0.8 - 15.0	-55° to +90°	± .005%
CR-19	BH6A	10.0 - 75.0	-55° to +90°	± .005%
CR-23	BH7A	15.0 - 50.0	-55° to +80°	± .005%
CR-24	BH6A	0.8 - 15.0	+70° to +80°	± .002%
CR-27	AR23W	0.080 - 0.19999	+70° to +80°	± .002%
CR-28	AR23W	0.080 - 0.19999	+70° to +80°	± .002%
CR-29	BH6A	10.0 - 75.0	-55° to +90°	± .005%
CR-30	BH6A	0.800 - 20.0	+80° to +90°	± .002%
CR-32	BH6A	0.800 - 15.0	+80° to +90°	± .002%
CR-33	BH9A	0.090 - 0.950	+70° to +80°	± .02%
CR-35	BH9A	0.090 - 0.950	+70° to +80°	± .003%
CR-36	BH6A	0.455	-40° to +70°	± .02%
CR-42	BH6A	0.2 - 0.500	-40° to +70°	± .01%
CR-44	BH6A	0.2 - 0.500	+70° to +80°	± .002%
CR-45	BH6A	0.2 - 0.500	+70° to +80°	± .002%
CR-46	BH6A	0.2 - 0.500	+70° to +80°	± .002%
CR-47	BH6A	0.2 - 0.500	+70° to +80°	± .002%

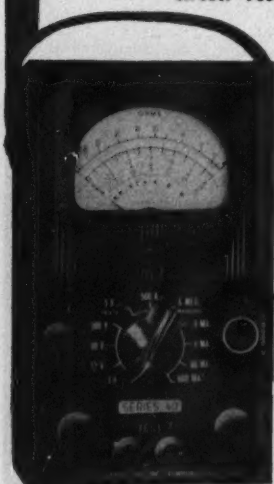
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- ★ 3 Resistance Ranges: self-contained batteries.
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assistant to BAI, the communications chairman, has signed up all the county hams in the RACES program. Middlesex County C.D. Hq., at Rutgers Stadium, is a popular gathering spot for c.d.-minded hams. ENM, C.D. Area 9 Radio Officer, conducted a successful communications test employing amateur radio facilities for c.d. alerts in Belmar, Bradley Beach, Avon, and Spring Lake. YLS, CGH, and 8JI are very active in mobile work on 75 meters. NIE is sporting a new 32V-3 and 75A-2 receiver. HNY was a recent speaker at the GSARA. WSN is active again after a long lay-off. Reports still are coming in so will combine both Jan. and Feb. traffic in next month's report.

### MIDWEST DIVISION

IOWA — SCM, William G. Davis, W0PP — F2O has completed "Operation Flood," a 22-page story on the amateurs' work during the Missouri River Flood. He reports election results of the club as follows: HFT, pres.; SVS, vice-pres.; DJU, treas.; CXN, secy.; F2O, "jimmy-legs." AZR heads Woodbury County Comm. Dept. of Civil Defense, as well as being chairman of the Red Cross Disaster Committee. QVA reports that BQJ is a new member of TLGN and is active on TEN and RN7. NAY is active after a 3-year lapse. BBZ is working on rig and receiver for s.s.b. HDR received his appointment in the AF MARS. CQL now is on with 300 watts. YBV has a new jr. operator, born at 12:31 p.m. just as the Iowa 75 Net got underway. BLH, DTF, MIE, YKS, BVE, FDM, and YBV have received Section Net certificates. The Burlington Club elected MDU, pres.; NLA, vice-pres.; ex-9QGU, secy.-treas. The IARC has club night on the air each Fri. on 29.6 Mc. BWL reports two new hams in his area, W0LSG and W0NAN. ATA will have a new QTA at Cedar Falls. FDL reports on the Muscatine gang as follows: KZW is going to college, GLI is rebuilding, LIJ is a newcomer on 40-meter c.w. VRD is chasing bugs in the rig. W0KSE is ready for General Class, BMZ is on 10-meter mobile, CUQ is ready for 40-meter phone. BGN now is on 75-meter phone. GDL reports to TEN and TLGN and calls DX. SCA and BDR make BPL again. AEH reports from Mesa, Ariz. Traffic: W0SCA 859, HDR 531, YTA 198, CZ 150, BQJ 138, QVA 135, BBZ 45, BVE 42, PZO 40, NYX 22, ERP 12, BLH 11, SEP 6.

KANSAS — SCM, Earl N. Johnston, W0ICV — SEC: PAH, RM; KXL, PAM; FNS. Proudly we hail the new club in Lawrence known as the Lawrence Amateur Radio Club. On Jan. 30th the first meeting was held at KPL substation, the constitution was adopted, and the following officers were elected: VBQ, pres.; NSB, vice-pres.; FON, secy.; FRL, treas.; FKO, act. mgr.; JUV, publicity. Meetings will be held the last Friday of each month. The KVRC of Topeka held a banquet and election of officers Jan. 9th. AAZ heads the club as president with GCD, vice-pres. and treas.; MXG, secy.; and UPU, publicity chm. FNS has been appointed PAM for Kansas. CIK resigned because of the heavy load of getting his TV station going, moving, etc. YFE, VBQ, FEO, BLI, and DRB have new ORS certificates. HAW has new NC-57. LOP is going to 2 meters with Bandmaster and beam. GCD has new Baco transmitter and CGI a new TBS-50 transmitter in their cars. NBM and MXA are new hams in Topeka. GEC has a new Viking II. 88B has moved to a country location overlooking Topeka from the North. KVRC has 35 members who have abided by c.d. certification under RACES. Traffic: W0N1Y 253, BLI 186, BET 65, FDI 37, FUF 34, BEO 20, WMQ 23, YOS 23, FSE 15, GHR 14, FJK 11, OBO 11, YOS 11, UPU 10, WGM 8, FEO 6, LIX 5, ICV 4, ZGK 4, GZR 2, KEN 2, OFR 2.

MISSOURI — SCM, Clarence L. Arundale, W0GBJ — SEC: VRF, PAMs: AZL and BVL, RM: OUD and QXO. On Jan. 19th DSO originated the Governors-to-President Relay message and placed it in Washington at 1825 CST on the same date. RCE reports an AREC drill for the St. Louis Area was held at 1:00 p.m. Feb. 1st on 10 meters. HUI has a new Gonset Commander mobile rig installed in his car. CMZ runs 110 watts to a Stancor ST-202-A and receives with a Super-Pro 400-X. CGJ is on with a new Viking II. CPI has installed a pair of 4-125As in the 20-meter rig and runs about 750 watts input. ICW has completed the addition to his home and moved his station into the new ham shack. GAR's 307-A went bad so he is on with the stand-by rig. WAP is building "parlor-type" rack for the rig so he can move it upstairs. The fly and income tax report cut down on QXO's traffic activities. The Rolla Amateur Radio Association elected FPK as president and GCL as secretary. EBY is busy building a new home. BHC spent several weeks in Pennsylvania. EBE is building new VFO and exciter. QMF is back on 2 meters. DTF now is located at Humansville. EBY is a new AREC member. The Show-Me Net now meets at 4:00 p.m. Sun. on 7.57 Mc. BPL certificates go to CPI and BVL for their nice January traffic reports. Traffic: (Jan.) W0CPI 760, BVL 547, JXJ 462, QXO 460, GAR 151, GBJ 114, IQY 104, CXE 102, IJS 67, K0FAY 54, WBD 50, W0EBE 40, HUI 37, CFL 29, OUD 22, KIK 20, QMF 12, RDG 12, VWN 10, TGG 9, BUL 7, CMZ 5, CKQ 4, BHC 3, WAP 2. (Dec.) W0WAP 3.

NEBRASKA — SCM, Floyd B. Campbell, W0CBH — (Continued on page 100)

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Asst. SCM: Thomas S. Boydston, 6VYX, SEC: JDI, RMa: VYX, LJO, PAM: EUT, ODB is having QRM in the form of a new YL. AUH informs us that he is enjoying HO Railroad as another hobby. Anyone wishing to exchange ideas on HO RR, contact him at 705 E. 12th St., Grand Island, Nebr. Comes a report from RYG with Nebraska C.W., TEN, TLAP, RNT, and PAN net additions. VYX has accepted the appointment of Assistant SCM. We want to take space here to congratulate the AK-SAR-BEN Club and VYX and his gang for the swell job they did on the License Plate Bill. DW deserves congrats also. The Nebraska C.W. Net is perking in good shape. RDN is a new member of the Net. QXR and VEC are working on teletype circuit on 2 meters. Your SCM would like applications for OBS or any other appointment you might want. CBH, ATU, and CKZ are the interference committee for North Platte. AIN is building a portable rig in addition to helping ex-ORR regain his ticket and build up a rig. WN9MAO keeps Mon. through Fri. sked with LTD and EGM. For those interested, the Rocky Mountain Division Convention will be held at Estes Park on June 20-21. Traffic: (Jan.) WFTQD 1928, RYG 207, FGR 79, VYX 70, CBH 48, AIN 34, ZLF 27, FMW 24, UVO 11, WN9MAO 11, W9AUH 7, IDO 6, QOU 6, BEA 4, BWK 4, HXH 4, THF 4, YSK 4, HQQ 3, KBR 3, BUR 1, VPR/M 1. (Dec.) W0JDJ 153.

### NEW ENGLAND DIVISION

**CONNECTICUT** — SCM, Roger C. Amundsen, WIHYF — SEC: LKF, PAM: FOB, RM: KYQ, CN-3640, CPN-3880, CEN-29,680 kc. UNG is DXing on 40 meters. BGT now is on a.s.b. NFG is new EC for Hamden. New officers of Stratford ARC are TCW, pres.; RFJ, vice-pres.; FMU, secy.; UAC, treas.; URC, comm. off. A new claimant as the youngest ham in Connecticut is WN1WYF, Don Forslund, of Stratford. Another new Stratford Novice is YL WN1-WZK. RRE lost his antenna in a school fire. NBP/WBO is going RTTY. LJO spends more time on his station. WNAB selling ham radio. WN1WV is new in Fairfield. Ellen, ex-6YYM, now is 1YYM but hubby Bob, ex-6YYN, only gets 1WPO. They are looking for a DX farm. LKF handled Governors-to-President Relay message through TIA. WIG now is on 2 meters. UZJ is interested in OPS appointment. URM in ORS. KGT is on 160 meters. PEA and ODW had antenna trouble in the ice storm while DBM tried out his generator. Stratford had a RACES meeting Jan. 29th. UGG is interested in OPS appointment, too. CKU is after ORS and OO appointments. Officers of the Hamden ARA are UJG, pres.; DDP, vice-pres.; UZJ, secy.; FKQ, treas.; NFG, act. mgr. MVH and DDP are a.s.b. During "Operation Icicle," Jan. 9th and 10th, the Stratford gang operated WIG, RCV, and TLO with 150 transmissions from 7 p.m. Fri. to 2:30 a.m., then 8:30 a.m. to 4:55 p.m. Sat. Operators were TCW, RFJ, UAC, SKO, and BEA. Mobiles were FMU, TCW, IAY, KUO, GVK, BGP. Traffic: (Jan.) W1SJO 303, AW 150, KYQ 111, BDI 70, CUH 66, RRE 59, FOB 45, NBP 22, HYF 21, NEK 20, RFJ 18, KV 17, LIG 8, QJM 7, ODW 3. (Dec.) W1ODW 20.

**MAINE** — SCM, Orestes R. Brackett, W1PTL — SEC: BYK, PAM: OIQ, RM: LKP. The Pine Tree Net operates on 3596 kc. at 1900 Mon. through Fri.; the Sea Gull Net meets on 3960 kc. at 1730 Mon. through Fri. Thanks to BWR, who operates K1NAI, we were able to get the message from our Governor to the President in plenty of time, originated from K1NAI to W1PTL, then on the Sea Gull Net to LKP and via the Pine Tree Net to Washington, D.C. Through the help of EOP, OIQ, LHA, AWN, MJE, SRW, BTY and TDK some very important traffic was handled during a recent snowstorm which crippled telephones and also Western Union lines in the Down East section of the State of Maine, an excellent job if you ask me. A hearing has been held in regards to getting our calls on our number plates here in this State. I don't know just what will happen but Ed Hudon, who presented the Bill, sure did a very nice job. Also Don Dean made a very impressive speech to the Committee on Transportation. QLU, from York, is new on the 75-meter band and sure has a swell signal, a pleasure to listen to. EBJ and family have a hay burner in the barn now and guess Amos has to do quite a bit of the exercising along with Lynda. A very good turnout on the State C.D. Net sure is giving with quite a bit of activity on Sunday mornings. The CS is BYK, who is Radio Officer for the State of Maine. Traffic: W1LKP 167, OHT 62, KYO 48, PTL 21, BX 18, EFR 11, VV 11, AFT 10, HXQ 9, QQY 7, SUK 6, QEK 3, VVX 2.

**EASTERN MASSACHUSETTS** — SCM, Frank L. Baker, jr. W1ALP — Appointments endorsed: As ECs: RCJ Marlboro, WB member of Region 5 comm., KLC Nahant, MRQ Groveland, KTG Cambridge, UE Wellfleet, GJZ Sherborn, DFS Somerville, LPM Natick, BWH Attleboro. As OPS: MRQ, IIM, and SCS. As ORS: MRQ and TY. New appointments: As ECs: ORA Wakefield, TYD Andover, WAG Taunton. As ORS: AOG. As OPS: TYK and TSB. Sorry to have to announce the death of FRP of Westport. GAG is on 3.9 Mc. during the daytime. Heard on 28 Mc.: IAO, KSU, TOW, PRR, JOM, and LYF. 4TKM is on at VAG's. UAR is mobile in Vermont. OJI

(Continued on page 102)



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is on 144 Mc. WJJ now has General Class license. ALP attended a meeting of the Quannapowitt Radio Assn. WB is in Rome. TOQ is on several bands, a.s.b. on 3.9 Mc. The Braintree Amateur Radio Club had a film from ARRL. TNK is building a 3" scope for monitoring. BB handled the Governor-to-President Relay message for Massachusetts and in the 160-Meter DX Tests using a 257' Kytoona antenna worked OH3NY. DWO has a mobile rig on 3.5 Mc. UTH made 10,000 points in the Jan. C.W. C.D. Party. A new club, the Amateur Association of the Boston Naval Shipyard, has been formed at the Navy Yard with the call USN. R80 is pres.; FVD, vice-pres.; Q08, secy. New officers of the Brockton Amateur Radio Club: TAV, pres.; ULJ, vice-pres.; OEG, secy.; IZB, treas. The South Shore Amateur Radio Club had Mr. Harvey and Mr. Persons from Harvey Wells Co. The Eastern Mass. Club had JOT and a guest speak on net procedure and an auction by AKY; also FUR spoke at another meeting. IPS is in charge of Sector 5 of Region 4. TVZ is rebuilding the rig. WKF is on the air from Atlantic Union College in Lancaster. VTT has new Heathkit Dip-meter. BGW and FH are going mobile on 40 meters. WN1WMX is a new ham in Taunton. TNK has Viking II driven by a Viking. VFO. Our Lynn EC, QQL, reports that they have a net on Tues. at 6:45 p.m. The monthly Region 5 meeting was held in Cambridge with Mr. Comerford, prof. Radford, NJN, BL, TQP, DFB, ALP, RM, KTG, DOP, and KUC present. NJN is acting as State Radio Officer. PYM has new NC183D coming. UBC finished up FTX's 813 rig and is on 20-meter c.w. BWH has a TBS-50 in the car and a battery-operated transmitter and receiver. The T-9 Radio Club held a meeting at TVF's QTH in Beverly. PWL gave a talk on "Capacitors" at the Southeastern Mass. ARA meeting. The Club meets the 2nd and 4th Wed. of each month. CTZ is pres.; AVY, secy. WGN is building receiver and tuning units to match his antennas. LAZ and AVY get on at 7 a.m. on 3870-3845 kc. UUD has his General Class license. The Hingham ARC, VPR, has a TBS-50D and SX-71 receiver in the Town Office Bldg. The Club meets the 1st and 3rd Tues. of the month at C. D. Headquarters. UUT has his Class A license. UHH has General Class. RYJ, HP, REI, STA, CCF, UUL, and Bob Thornton, ECs of Region 4 communications c.d. and members of the Gypsy Radio Club, met with Region 4 Directors. In the recent state-wide test Sector 5 of Region 5 was represented by the following: TYN, THY, SEI, VPR, NZO, CQN, ALP, QVN, KWD, and MME. BL was at Region 5 Headquarters. TQP was on for Sector 5, Boston. LMU worked G5RI on 160 meters with 15 watts. RM is mobile on 6 meters. JOW has tri-band converter. PBM has RME mobile converter. NAV increased power on 6. EK has revamped UHX10 for 6. QMU is back on the air. FUR is active on 2, 6, and 10 meters. LPM, Natick EC, reports things are coming along in good shape. BB, Winthrop EC, reports that his town is going to tie in with Revere on 6 meters with DOP and DJ. PBX has his own station on the air. WN1WJZ has a 5-watt crystal adapter for a TR-4. TQN has his General Class license. TVZ has 75-watt rig on 40. UIR, MB, and CK are on 6 meters. ZK, OKB, and VN are on 10 meters. TYU is mobile on 10. SSA is mobile. Traffic: (Jan.) WIEMG 131, TY 128, NU 114, JCK 90, LM 88, AVY 28, IBE 20, WU 18, TOQ 13, BY 10, QON 10, BB 8, HWE 8, TNK 8, SCS 7, DWO 5, CTR 3, LMU 2, UTH 2, VTT 1. (Dec.) WITOQ 104, RDV 13, DWO 3.

**WESTERN MASSACHUSETTS**—SCM, Roger E. Corey, WIYJH—SEC: KUE. RM: BVR. PAM: RDR. WMN meets at 7 p.m. Mon. through Fri. and WMNS at 8 p.m. Mon., Wed., and Fri. on 3560 kc. New ORS are DVW, LJQ, MND, RLQ, and UVI. DVW's 20 watts and baywire antenna have produced European contacts on 3.5 Mc. TVJ has increased power to 150 watts for better net coverage. LJQ has organized c.d. activities in Northampton. MVF has a new 8-lb. baby girl. BDV made a junk-box GDO using tuning eye tube for an indicator which works FB. COI skeds 4KLF but finds 14-Mc. conditions rough with no beam. RM BVR leads the section in traffic again and reports that he is much pleased with attendance on WMN lately. We welcome WKF to the section—note his traffic total. Hampshire County hams meet every Thurs. at 8 p.m., Old High School, Northampton. QOC, MNG, LIB, JYH, and RDR took part in the phone C.D. Party and EOB, JYH, and DVW in the c.w. Party. Early reports indicate that EOB may have the highest national score in this contest. KUL spoke to the HCRC on linear modulation systems. AVK has a neat 420-Mc. tripler which can easily be driven by a 522. PKI now is 2CPD. UVI, PIR, LKA, and UTP spend one night a week operating and installing equipment at Westfield C.D. Hq. EOB and JYH have super-selective c.w. receivers under construction. MUN mixed business and pleasure on a trip through the Far West. OBQ has a new 8-76 receiver. LRE and KZU are experimenting on 2300 Mc., while RVW and QWJ are having fun with telephone company 4000-Mc. gear. Please get your activity reports in by the 5th of each month—no reports in column! Traffic: WBVR 61, EOB 37, RRV 35, WKF 1/29, TVJ 27, TAY 18, JYH 16, MVF 16, UVI 10, MNG 9, RDR 8, DVW 4, MND 4, BDV 2.

**NEW HAMPSHIRE**—SCM, Carroll A. Currier, WIGMH—SEC: BXU. RM: CRW. The Brass Founders

(Continued on page 104)

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If you feel you are qualified and interested in working with a compatible and highly respected group on projects ranging from component items to broadcast and amateur equipment and without the disadvantages of over-specialization and resultant boredom, write to A. M. Pichtino, Chief Engineer. We would appreciate a resume of your education and experience in your first letter together with a recent photo. All responses will, of course, be held in strict confidence.

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Club elected the following officers: RZD, pres.; FTJ, vice-pres.; TTU, secy.-treas. BBI has a Viking II. The Merrimack County 10-Meter Net has a better than 50 per cent attendance. FTJ is the proud possessor of certificate No. 2 for YL/WAS and also won the YL Anniversary C.W. Contest for the third consecutive year to retain the cup. Why not call in the NHEN on 3850 at 1:00 p.m. on Sunday? BXU will be glad to welcome you all. UNV is going to town with his new Viking II on 20 meters. COC is the new Merrimack County EC. CDX is doing a fine job recruiting members for NHEN. He is our new Rockingham County EC. We welcome APM to New Hampshire from Massachusetts. TDH now is 3U00. What about applying for an appointment that seems interesting? BFT has received a certificate for WACE from the Radio Club de Chile. Why don't some of you appointees get in on LO-NITE? Notice how our traffic reports are on the increase? FBI CDX has been trying out the 21-Mc. band. Traffic: WICRW 374, GMH 41, QJX 16, FZ 9, CDX 8.

**RHODE ISLAND** — SCM, Merrill D. Randall, WJBB — SEC: MJJ, RM: BTV, PAM: BFB. A meeting of the R. I. C. W. Net members was held at JBB's QTH with BTV presiding. New net rules were decided upon and several new members were recruited. The RIN meets Mon. through Fri. at 1900 EST on 3540 kc. QR, BTV, TGD, BBN, and JBB were present. New certificates will be issued as soon as all applications are passed upon. Certificates endorsed: TRX as OPS. BBN as ORS. R. I. C. D. 'Phone Net, OIK control, meeting Sun. at 1000 EST on 3993 kc., is contemplating revision to regular traffic net. All interested, talk to OIK, OMC, ONZ, or TRX. TRX, because of an unfortunate fire in his shack, has been strictly mobile for the past two months but now is back on 75 meters from his renovated home. We could use a couple of applications and recommendations for OO appointment. Newly-elected officials of NCRC are TXL, pres.; UOO, vice-pres.; ULS, secy.; OMC, corr. secy.; TFX, treas. NCRC's meetings are held every Mon. at 2000 EST at Seamen's Institute on Mill St., Newport. The PRA has not yet forwarded a list of new officials. Let us have some more dope from you fellows. Traffic: W1QR 57, BTV 51, OIK 16.

### SECOND VERMONT QSO PARTY

The Tri-County Amateur Radio Club of Brattleboro, Vermont announce their sponsorship of the 2nd Vermont QSO Party and invite all interested radio amateurs to participate. Here are the details:

(1) Time: 24 hour week-end period Saturday, April 25, 1953, 6 p.m., to Sunday, April 26, 1953, 6 p.m. EST.

(2) No time limit and no power restrictions.

(3) Scoring: *Vermont Stations:* 1 point for each contact and multiply by the number of States, U. S. Possessions, Canadian Provinces and foreign countries worked during contest period. *Outside stations:* 5 points for each Vermont station worked and multiply by the number of counties in Vermont worked during the contest period.

(4) A certificate will be awarded to the highest scoring station in each state, U. S. possession, Canadian province and foreign country, also to the station with the highest score in each Vermont county.

(5) The following frequencies are suggested to congregate near: 1810, 3520, 3740, 3860, 7050, 7250, 14,100, 14,250, 28,100, 28,800 kc.; 51, 145 and 221 Mc. Stations are urged to spread out to keep QRM down and to allow low power Vermont stations to be heard. Use more than one band if you wish, but remember that a station may be worked only once for credit. There are 14 counties in the state of Vermont.

(6) General Call: "CQ VT." Vermont c.v. stations should identify themselves by signing *de Vermont* (call) K. Phones say "In Vermont."

(7) Contact Information required: Vermont stations send RST or RS and county. All others: RST or RS and state, possession, province or country.

(8) Logs and scores must be postmarked not later than May 25, 1953, and should be sent to Tri-County Amateur Radio Club, % Val Morehouse, W1AZV, 27 Grove St., Brattleboro, Vermont.

**VERMONT** — SCM, Raymond N. Flood, W1FPS — SEC: JEN. PAM: AXN. RM: OAK. Asst. RM: TAN. OAK met the Governor and got Vermont's message for the Governors-to-President Relay. CGX is home from the hospital. FPS is rebuilding transmitter using a 2E26 to an 813 final but is having trouble trying to drive the 2E26! Vermont's c.d. net now is holding weekly drills regularly. No other news was received here this month. Please send in items. Traffic: W1RNA 120, OAK 103, NDB 31, IT 19, FPS 18, TAN 13, ELJ 7, TXY 6.

(Continued on page 106)

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Tilt-Top Head. ....		\$34.50	

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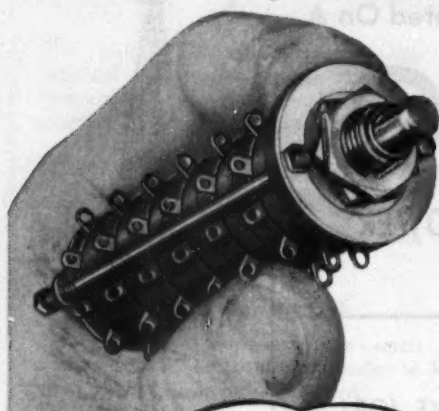
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## NORTHWESTERN DIVISION

**ALASKA**—SCM, Glen Jefferson, KL7NT—Business on 2 meters is getting under way; AMZ was heard making a schedule with VT for a try. VT has arrays on 2 and 6 meters and has time to check out with anyone who can work in those bands. AH and AGU will modify their Vikings for 6 meters soon. BK and NT are building for 2 meters. AEE is working hard as NCS for the Sourdough Net with all hands having rough going on account of the persistently poor signal conditions. Recent high winds in Anchorage laid low a few antennas and persistent cold weather dampened enthusiasm for repairing the damage. Traffic: (Jan.) KL7AIR 562, AEE 77 (Dec.) KA7LJ 1750.

**IDAHO**—SCM, Alan K. Ross, W7IWU—Lewiston: IDZ reports OWA has a Lyco mobile rig. POZ traded his 8-20-R for an 8X-28, and is working on a new rig. HDT is QRL with new jr. YL in the family. Will each club please send in a report each month? Also, any new clubs, please write. Reports from individuals are especially welcome. Boise: GHT resigned as EC because of the pressure of business. How are you fellows making out on 40-meter 'phone, also 75 and 20? Letters were received from ex-TEEO, working for Raytheon, Waltham, Mass., with transistors, and from KIL, formerly of Mulholland, Palmdale, and Spokane, now with the U. S. Geological Survey, living at Vienna, Va. IDZ received WAS certificate and now is going after WAC. Twin Falls: The Snake River Keys and Mike's Club's new officers are OQT, pres.; CIG, vice-pres.; and QZU, secy-treas. Traffic: W7FIS 4.

**MONTANA**—SCM, Edward G. Brown, W7KGJ—The Misoula gang holds hidden transmitter hunts every Sunday with a great deal of interest shown by all. COH spent three weeks with his son, who is stationed at Fort Ord, Calif. COH is active on the CARS Net only. Rigby has a new 10-meter rig. NCS, PX, and PGF are active on 160-meter nets. W7RSK and his XYL, WN7RSI, have a new 8X-71 receiver. Work has kept BIS from hamming lately. JRG is working on sixteen-element beam for 2 meters and Ken also is finishing compression-type limiter for his audio system. FKW and IKE are newcomers to the mobile gear in Billings. LCM has been active on 15 meters lately. IWW is mobile with 110 watts input. Doc has two PE100s in series with 1100 volts on the plate of a tetrode. CRV gave a demonstration with a "Q" meter at the Billings Club. Montana nets are in need of some traffic to revive a little more interest. Thanks to the Novices for some nice reports. Please keep them coming. Traffic: W8BTU 7 110, W7OPM 27, SFK 12.

**OREGON**—SCM, J. E. Roden, W7MQ—ONM makes BPL again with a total of 617. PPG reports that the Cascade Traffic Net on 29.2 Mc. is rolling along in good shape with a good number of check-ins and lots of activity. Net officers consist of the following: PPG, net mgr.; ODZ, asst. mgr.; JDN, director; KWI, secretary; QEP, recorder. HAZ is recovering from an operation and now is on the mend. Traffic: W7ONM 620, PPG 64, MQ 6, EDU 3.

**WASHINGTON**—SCM, Laurence Sebring, W7CZY—SEC: BTU, RM. FIX, PAM, NRB. The Sound Traffic Net (STN) meets on 29,100 kc. at 2030 PST daily. Members of the Net are PGY, OS, SHT, RDL, PRV, JPH, KCO, QPC, BG, NMT, JOO, BA, QOU, AMC, PIO, RTQ, SBH, JGF, and SKT. The Northwest shows a majority strongly opposing a change in license procedure. The North Seattle Amateur Radio Club showed this in an exhaustive written poll prepared for its membership. Seattle amateurs are going all out to defeat proposed city legislation restricting size and height of towers and antennas. Newly-elected officers of the North Seattle Amateur Radio Club are CBE, pres.; OEX, vice-pres.; JPH, secy.; PGY, treas.; RDL, master at arms. VI is finishing up a new power supply. JNC is building a new 200-wattier. IGM has a new 20-meter beam. KZP is building a flea-power transceiver. OE has a 40-ft. mast plus a 66-ft. vertical. He is a member of the Old Timer's Club. ZDF's present QTH is U. S. Naval Radio Station, P.O. Box 101, Marietta, Wash. His equipment is a Lyco 6008 and NC-125. NSI is having trouble making electronic key work. ZU has completed a relay-less auto keyer and it works! AIB's short story: Nice 40-ft. masts and folded dipoles—Big winds.—Now have nice 25-ft. masts, 150-ft. Marconi, pi-section and is getting out FB on 80, 40, and 20 meters. RDU has a new HRO-50. HB transferred from the wilds of Montana to Walla Walla. Major Art Monahan, W7SOX, from Seattle, presently is signing DLAA in Germany. He is slowly heading for the DXCC award. Traffic: W7IOQ 2780, BA 901, FIX 344, PGY 343, CZX 235, PYV 122, TH 86, RKQ 65, OPO 48, OE 45, PRV 37, AIB 33, MNT 33, RDL 32, AMC 22, FRU 20, SBH 19, BG 17, SKC 12, ETO 8, HNA 8, ZU 7, NWP 6.

## PACIFIC DIVISION

**HAWAII**—SCM, John R. Sanders, KH6RU—HARC planning is well under way for a full-scale Convention to be held in Honolulu Aug. 15th. All section residents, as well as those amateurs who may be military transients, are invited and urged to attend. This will be the largest get-together ever staged in the Pacific Area! Details will appear later. The Honolulu Mobile Club really resurrected 28 Mc. by holding a mobile-to-mobile and mobile-to-fixed contest (Continued on page 108)

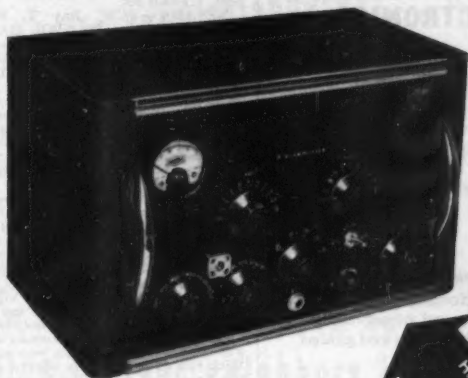
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with juicy prizes. The activity was fierce, both day and night. WKIT/KH6 now activates the Kona Coast as National Guard instructor at Kealahou. His XYI, WNSUGT, also will convert to KH6. W6UWL/KH6 has a traffic total of more than 200 this month, all mobile! KG6AEP, now OO on Guam, is our old friend, KH6PY. HARC now has a TVI Committee functioning and urges all troubled brethren to avail themselves of the service. Traffic: (Jan.) KG6FAA 3184, KAZHQ 1260, KG6ADZ 1246, W6UWL/KH6 202, KG6AEP 1. (Dec.) KG6ADZ 1094, KA8AB 601.

NEVADA—SCM, Ray T. Warner, WTJU—SEC: HJ. ECs: KOA, LGS, NWU, OXX, TJY, VO, and ZT. OPS: JUO. Recently-elected officers of the Southern Nevada Amateur Radio Club are PRM, pres.; DVJ, vice-pres.; OBW, rec. sec.; BJY, corr. sec.; LGS, treas. MBD is chief engineer at KORK in Las Vegas. RKE is heard regularly on 40-meter c.w. JU is active with new Viking II and making antenna changes. NWU's new location is the envy of any ham who sees it. Zeke has taken over the abandoned CAA radio station site at the Gabbs Airport. He has miles of wide-open spaces and no neighbors! ZT, HJ, and LGS are busy planning RACES activities. The Las Vegas and Boulder City 10-meter gang now is found on 2875 Mc. JUO is sharing his 10-20 beam with neighbor KJQ. KH6ARD now is heard operating K7PAR, Nellis AFB. LGS leaves April 1st for a cruise to KH0-Land.

SANTA CLARA VALLEY—SCM, Roy I. Cousin, W6IZL—The Bills for license plates for the hams are being prepared for presentation soon and we will get them only by proving that we are ready to perform, at all times, public services. So let's all get together and get the gear ready and be there when we're called. The High Frequency Amateur Mobile Society was host to the Central California Radio Council recently and the main discussion was the bid the hams again were making for license plates. With full cooperation we have a good chance to make it this time. This month the Monterey Bay Radio Club had a White Elephant Night which produced a lot of anxiety and humor. The NPEC also held a business meeting in January. The SCCARA had a speaker from Stanford this month. HC reports in with a small traffic total but still is plenty busy over at State. IUU is busy on the Palo Alto Emergency Net, at 2000 Mon., on 146 Mc. QYO is building up a 144-Mc. rig to get back on after a year's lay-off building a new QTH. JWD has a new screen mod. rig on 144 Mc. NMV has gotten the "N" out of his call and is ready to give 40 meters a whirl. FOA is getting a 144-Mc. beam up at his new QTH. FBX has most of the bugs out of his new 2E26 144-Mc. transmitter and is checking into the Palo Alto Emergency Net. CAZ reports he is mobile 75 and 2 meters and is building a new 813 final all bands to 10-meter 'phone. RFF reports he finally is getting time to operate and is working on a kw. final. At the Feb. 6th meeting the PAARA had a panel of experts, with questions on any and all radio topics, transistors through triangular wave-guides to r.f. disturbances in Patagonia. CSN, CAZ, and WMO skipped a board meeting because of flu. Traffic: W6YHM 354, HC 25, RFF 23, 8YW 8, MMG 4.

EAST BAY—SCM, Ray H. Cornell, W6JZ—ACN, representing the CCRC, has devoted a great deal of time to assure that the necessary legislation be passed to provide California hams with license plates. TVI in the East Bay is a topic of top interest. Although each case has been processed to a successful conclusion the few committees available have been greatly overworked. Also, there has been a large increase in the number of cases received from FCC. Won't you help us solve the TVI problem? The only requisite is the willingness to spend a little time on the committee each week or month and to be as helpful as possible. An invitation is extended to all hams regardless of affiliation. We need your help. Volunteer by dropping a card to us at once. The Northern California DX Club turned out in force for the February 'phone contest. The DX Club was honored by a visit from Gus Westerberg, SM5UM. TI is having TVI. PYH and GIZ are helping him rework the gear. GIZ put an amazing 'phone signal into VK and ZL during the Contest with a.f.m. TT has forsaken ham radio for photography. DUB has gone in for model railroading; the only code he needs is the letter "Q" to signal the crossings. PB has five complete finals and can change bands in three seconds. LDD has moved to a new QTH and did well in the 'phone contest. NIG has deserted the ham ranks temporarily and has moved to Corcoran. 3CIR bought Joe's QTH as well as the complete ham shack. PYH has 10-, 15-, and 20-meter rotaries for the contest. "Mobilizing" is fast becoming one of the most popular of ham sports. VSV and MXQ have engineered a 2-meter mobile installation for the Berkeley-Albany EC Net. Any one interested in building one of these and joining the net, contact DNX. Alameda mobiles have formed a group known as the Skyriders Radio Club. They meet Wed. at 8 P.M. on 28.560 Mc. The NC8 is MGE. Some of the participants are BSE, KSP, ANK, B8Y, FVK, WD, 2VVT/6, 6ELP, NCL, and INE. They meet the 4th Sat. at the various homes for social activities. XYIs are active in the Club and the president is the XYI of KSP. Other officers are MNK, vice-pres.; 2VVT/6's XYI, sec.; B8Y, treas. M. Diabolo mobiles had breakfast and field strength tests in February

(Continued on page 110)

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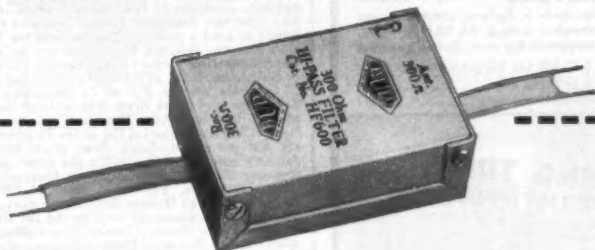


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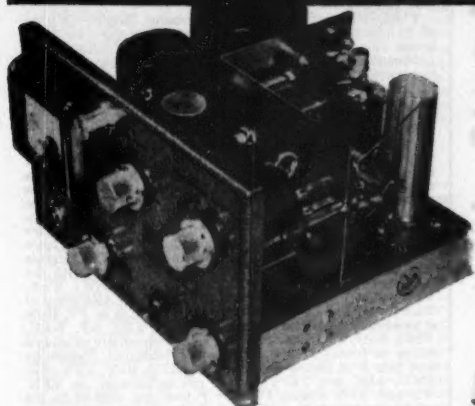
at El Monte Drive-In. Attending were KGABW/VH, WEHJE, LGW, LTE, MEZ, NVJ, RVC, and WAW/YQ. has built a beautiful VFO and driver. ZHU, AFC, and WGM have been checking in on Region C.D. Net, on 6 meters. Can regularly check into staff net on 3900 kc. Sun. mornings. BS has new Elmac in the car. PHI has a BC-312 and GF-11 on 80 meters. NTU and ELW now are working with TVI committee. AFC is E.E. student at Cal. JOH is doing a whole of a job on ANS. IPW missed BPI by 5 minutes. Traffic: W6IPW 495, JOH 242, HHX 60.

**SAN FRANCISCO**—SCM, R. F. Cseikowitz, W6ATO  
JU 7-5561. SEC: NL. PL 5-6457. **Eureka Area:** EC:  
SLX. The Emergency Corps, under SLX, again proved its  
great usefulness during the severe storms and floods of  
this winter. The Corps is now operating on a very  
critical period. CWR is using a new 50-watt rig on 20  
beams. EQJ now is in his new home. AEY is working  
160 meters. QCS has a new final with 813s. KTU is the  
new d.c. director, assisted by CWR. JTD is antenna building  
and AEY is trying out the 21-Mc. and ZSE has a new  
21-Mc. rig. Mer. is working on 160 meters. BMM is  
operating both at home and mobile. SLX has joined the  
seabees (USNR). The Christmas party was a great suc-  
cess, being attended by over 80 people. The HARC Emer-  
gency Net meets each Tues. at 7 p.m. on 29.160 kc. QGY, of  
Fortuna, has been appointed an Official Relay Station,  
and has decided to operate on 3000 kc. on the 15th of Jan.  
on MARS circuits. He rates BPL on the January total.  
The Humboldt Amateur Radio Club meets the 2nd and 4th  
Fri. in the YMCA rooms, Municipal Auditorium, entrance  
on "E" St., Eureka. **San Francisco Area:** EC: BYS. Many  
thanks to the San Francisco Naval Shipyard Radio Club  
for the donation to the Emergency Committee of the proce-  
dure for a special license held for the emergency, held at  
the New Tivoli Restaurant. This will provide a 300-ohm  
Drake high-pass filter for each investigating head of the  
TVI Committee. Thanks also to the Zaack Radio Supply  
Co. for the generous donation for the TVI auction of a  
motordriven sander and drill. Reporting in with traffic  
on the 15th of Jan. is the new official relay station, the  
Official Relay Station. Jack now is MARS Air Force station  
AFGGCV, and is acting as a voluntary reserve training  
unit. Recruits are welcome and will be taught code and  
theory to prepare them for the amateur license examina-  
tions. If interested phone JU 4-5962. **Phone stations in the  
San Francisco section are:** to check in on the AREC,  
new Sun, mornings, 1030 on 3700 kc. KZL 9A, 3700 kc.  
NC. The San Francisco Radio Club and the HAMS have  
joined to hold a code and theory class for Novices and any  
club member desiring to prepare for an amateur license.  
For information phone George Baney, UEV, at MI 8-1780 or  
Bill Green, BYS, at BA 1-6157. The San Francisco Radio  
Club meets the 1st Fri. at the Shipyard, where visitors  
are not permitted. **Santa Rosa Area:** EC: LOU. At the  
January meeting of the SCRA the guest speaker was RCAF  
and VE7, W. H. Hickey, who spoke on "Amateur Radio"  
within receiver. The Club held its "Annual Shindig"  
potluck dinner at Heinies Hall, Fetter Springs. The Sonoma  
County Radio Amateurs meet on the 1st Wed. in the Board  
of Supervisors Room, County Court House, Santa Rosa.  
**Marin Area:** No news from this area, other than that of  
the AREC, new Sun, mornings, 3900 kc., KZF NC.

## ROANOKE DIVISION

**NORTH CAROLINA**—SCM, J. C. Geaslen, WD4LX. Many thanks to VG for the nice two-page report from the Asheville Area. Through the courtesy of WNAWWW's father the Asheville Club has a nice new shack for the club station, MOE. New officers for 1953 are AFM, pres.; MZS, vice-pres.; VG, treas.; and R. J. Eeherd, Jr., secy. BMG is bragging about his new 32V-3. Novices USJ, YBW, and YBX are racing for WAS and General Class. Congrats to AFM on his fine emergency traffic for the Southern Railroad during the recent blizzard. AKC reports the Gastonia Club now is 100 per cent ARRL. VGB is a new member of NCN. BDU, Charlotte, is racking up a nice score in the contest with new antennas. BAA now is a 75-meter mobile. The Charlotte Area Emergency Net, Greensboro Field Emergency Mobile Net did some fine work picking up late donations for the March of Dimes. 8GD, Fuquay Springs, a new OPS, had the honor of originating the North Carolina Governor's message in the Governors-to-President Relay. Thanks to ANU, ONM, and PZE for the assist on this. North Carolina's top traffic man, AKC, the RM, made BPL this month. How about some

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**SOUTH CAROLINA**—SCM, T. Hunter Wood, W4ANK—Tentative date for the Spring S. C. Hamfest is set for April 26th at the State Park near Columbia. As usual it will be picnic style with MWH, Roanoke Division Director, as guest speaker. DMX obtained and transmitted the Governors-to-President Relay message on Jan. 19th, which was delivered to a Washington station within 15 minutes after origination. CXO is OPS. UFP attends school in Columbia and operates from Hartsville week ends. 1VDR, ex-TA2VDR, is new to Charleston. 8BDF/4 is on the air from the Isle of Palms. UMV and his father, WN4-WKL, have moved to Camden. WN4WKL is being transferred to Korea. New officers of the Rock Hill Club are UOB, pres.; TTX, vice-pres.; NTD, secy.; WN4UMW, treas.; UMV, custodian; UNO, clerk; and NDH, trustee. The Charleston Club is forming a TVI committee. The Anderson Club is sponsoring a program intended to promote a National Amateur Radio Week and to obtain license plates for South Carolina hams. FFH is Alternate NCS on the S. C. MARS Phone Net. The Spartanburg Club has applied for ARRL affiliation. Traffic: W4FFH 140, ANK 117, FM 5, JGM 5, DMX 1.

**VIRGINIA**—SCM, H. Edgar Lindauer, W4FF—A total of 35 stations reported traffic during January. An additional 12 stations passed on other kinds of information pertinent to all of us. The March of Dimes Campaign found the mobile units throughout the State organized to help in picking up contributions. Stations known to have participated were CJI, GEB, JKN, BF, CU, EHC, FWO, GMY, ILW, JCI, JSG, KDX, KFC, KME, KPI, KRQ, LKI, NEW, OMR, OP, SQF, TNQ, UHN, WRH, THM, QCT, JGS, SAQ, 88V, and IYL. MLE departed for an assignment as news director at WCOJ at Coatesville, Penna. FOR appreciated the help of ham radio during the serious illness of a family member and wants his thanks to be known through this column. JHK, FJ, NAD, and NF took an active part in the Governors-to-President Relay by monitoring net frequencies. NRO returned to William and Mary College for postgraduate work and station PYN once more is very obvious on VN, VSN, SSN, and EAN. The Virginia Novice Net (VNN) operates at 1830 on 3705 kc. with the following NCS: Mon., WN4VQY; Tues., KSW; Wed., PBX; Thurs., TYC; Fri., TVI. WN4WOP, vice-pres. of Yorktown Mine Depot Radio Club, dropped in on FF. He is a newcomer to Annandale. JTP, KVM, LRI, NF, WBC, NRQ, RIG, FF, SBA, SN, and UCI, helped out as mobile riders in recent area campaigns for Muscular Dystrophy and March of Dimes Drives. CAK, RDJ, RIV, RTV, TE, JMU, 3JE, and 3FPT earned net certificates on VFN. VN and VFN inherit IWA at Petersburg, thanks to the telephone company. UBC and W2S also join us as newcomers. OP is new Falls Church EC. HQN, with the help NTZ, added two new 800-ft. "V" beams 90 feet up. LJE is South Norfolk EC. Keep in mind the 4th Annual QSO Party early in May. SDK's new QTH is Hickham Field, Hawaii. Keep in touch, OM, Traffic: (Jan.) W4JOT 353, FV 184, GR 131, SHJ 131, UWS 104, FF 103, UHG 78, KRX 74, NV 66, KFC 57, JAQ 56, MWH 55, FOR 51, NRO 47, LK 46, MAD 44, KX 43, IYI 36, CFV 26, RCM 25, KSW 24, FOR 20, SPE 19, BZE 17, SNI 17, LW 16, TYG 16, AKN 14, JAU 13, OWV 12, JUI 10, RDJ 6, VQZ 6, WBC 5, LK 4, TVX 3, PYN 1. (Dec.) W4SNH 20.

**WEST VIRGINIA**—SCM, John T. Steele, W8MCR—New officers of the Tri-City Amateur Radio Club are HZA, pres.; ETF, vice-pres.; Paul McCormick, secy.-treas.; UYR, publicity and activities director. FMU had a station set up at the Hobby Show in Morgantown. About 325 messages were originated. The Princeton Amateur Radio Assn. was the unfortunate victim of a disastrous fire recently. The meeting place and all the club gear were completely destroyed. HZA reports good hunting on 80- and 40-meter DX. Activity on WVN picked up in January with 104 messages reported. The phone net also showed quite a bit more activity with 58 messages. I have a report that JBH is working hard on the call-letter license plates. PQJ is new OBS, OPS, and OO. AI is going to get busier. YPH, our SEC, has a lot of openings for ECs. If interested, please contact him at 500 Kirk Street, Princeton. EVR and HZA both handled the GPR message. The Stonewall Jackson ARC, with JZO and GVR, addressed the high school in assembly hall demonstrating ham gear. Traffic: W8AUJ 1187, GEP 37, HZA 33, GCZ 30, GUL 22, JZO 15, DFC 14, EVR 7.

#### ROCKY MOUNTAIN DIVISION

COMING: Rocky Mountain Division QSO Party, May 16-17. Watch this space in May QST for details and rules.

**COLORADO**—Acting SCM, Karl Brueggeman, W9CDD—SEC: KHQ. Asst. SEC: PGX. RM: KHQ.

**PAM: KHQ.** The Rocky Mountain Convention now is a fact. It is planned for June 20th and 21st at the Elkhorn Lodge at Estes Park, Colo. Contact WRO for registration details. A QSO Party also is planned in order to acquaint everybody with the convention. It will come off on the week end of May 16th and 17th. Prizes and rules will be announced next month. The El Paso Radio Club, Colorado Springs, election results were ANX, pres.; EYI, secy.-treas. RCU later took over as secretary as EYT is working most of the time. The Club now is conducting demonstrations on all types of test equipment. COK is knocking off DX on 40 meters. CVG, RCU, WPK, HEM, GBX, and BYW are holding their own on 75 meters. CCG and ANX are rebuilding their mobile rigs and COF has a new all-band mobile. COB will be working us from the Far East soon. KHQ is in there pitching in traffic work. We have a new father-and-son team: W9MREH, Dick, Jr., and his dad, CQX. OTR is our only Denver OO. Bill would like to see more OOs in our section. Contact him for details. CNK is in Denver now, having been transferred from Ft. Dodge, Iowa. 9NLZ/8 is here from Chicago. Our Director, DD, has been transferred to Turkey and is turning the directorship over to IC. We all wish Frank the best of luck and success in his new assignment. We will miss his able and sincere guidance of the Division. Traffic: W4KHO 381, E3KQ 365, K4PAM 345.

**UTAH**—SCM, Floyd L. Hinshaw, W7UTM—The GPR message was secured by JPN and relayed on TLAP direct to Washington, D. C. QDY advises that he has built a modulator for his HT-17 to take advantage of the new regulations for 40 meters. LQP received his Advanced Class license before the deadline, but is not settled in his new QTH. He says look for him about June. (The balance of the Utah section space is relinquished in favor of the Division QSO Party announcement. Let's all help, and become better acquainted.) Traffic: W7UTM 232.

### SOUTHEASTERN DIVISION

**ALABAMA**—SCM, Dr. Arthur W. Woods, W4GJW—TMH has joined the AREC and is building up emergency equipment. KCQ has revised his directional antennas and has beams on top of beams with 144 Mc. on top. Bill Stanfield, of Jacksonville State College, has expressed an interest in our hobby and will be visiting the Anniston gang for help. HA, in Anniston, had his OBS and OPS appointments endorsed and is developing a final for 75 meters. OHO is regularly heard on both section nets. BFM continues to deliver traffic from several nets to the North Alabama Area. PPK is looking for crystals 452.8, 448.6, 450, 447.2, and 451.4. Going s.s.b.? KIX continues to keep AENB in business although he claims 85 per cent of his time is spent in ragchewing. UHA soon will be ORS and meets the AENB and DON Nets. The Birmingham Club is publishing a really good monthly bulletin. The Huntsville Club pursues an ambitious program schedule with films, code and theory practice, auctions, etc. TKL is scheduled to start meeting AENP in March. Traffic: W4UHA 117, KIX 91, PPK 43, QAT 36, HFM 23, OAO 19, GJW 7, HA 2.

**EASTERN FLORIDA**—SCM, John W. Hollister, Jr., W4FWZ—JFH put new life into the FN net in January as the 3075 kc. spot sounded good. The net meets each night except Sun, at 8 P.M. Traffic-handlers, your help is needed on 3075 kc. February was the Tampa Fair month and from early indications both phone and c.w. nets had their hands full of traffic. Daytona: The hamfest at RWM's place went over with a bang. Clewiston: Visitors at PJU were 8WSL, WDDC, 5LAK, 9EH, and 3PWV. Fort Lauderdale: Our new SEC reports the Pelican Net off to a big start with MVR as NCS. Jacksonville: The JARS will get Doc's call. W4UD, Nov Novice in WN4ZBE. UHE has National 183D. OGD is going mobile, HKR has HRO-60T. PI has left Jacksonville. Miami: IYT sends beginners' code practice on 28.7 Mc. We welcome YN to Florida. Louis is on with a Bandmaster. IEH sports new 32V-2 Collins. WSJ has a 75-A, SAT scored about \$5,000 points in the January CD Party. MKP, at M.L.T., is on 14,075 kc. Sun, at 9:30 for QSOs, reports WYR. It's BPL for DRD (by 'phone), 3ULM, at Hq. 456th Tr. Carr. Gp., reports others at the base include W4RQH, W4ROQ, WAYCW, WN6TKH, W5VLG, W1VOG, W4LBN, WN4YIK, and W5STW. RQH is an Asst. EC for the Base. Orlando: NKD was honored by the Club with its Oscar. Sarasota: TFP reported no damage from the freak twist. Appointments: New ECs include VIE, RKY, NRT, SVI, MGW, KOH, and PUJ. OO's include TVQ and TVX. IM, our new SEC, is OBS. TVX, in Jacksonville, is a most welcome traffic man. He was net NCS back in Virginia. Fellows, support the AREC. Get in touch with W4IM. The AREC has really grown in the past couple of years. Traffic: (Jan.) W4FPC 245, DRD 222, PZT 198, PUJ 169, FWZ 115, LMT 113, WS 76, KJ 54, RWM 31, IM 2. (Dec.) W4FPC 423.

**WESTERN FLORIDA**—SCM, Edward C. Collins, W4MS—SEC: PQW. EC: PIE. GQM has Extra Class license and renewed ORS and OO appointments. TL has moved to Anderson, S. C. ACB has a kw. rig. OMN is on 'phone. SFX is doing FB for the EARS group. SWF has Extra Class ticket. JM is working short-skip ten. KWM puts out a terrific signal on 20. PLE has nearly completed the console. MFY is putting the TBS-50 in the car. NJH is another mobiler. RKH keeps the SCM informed as to the activity over Eglin way. SSP meets the Alabama Net.

UNV works KH6s without an antenna. VAQ is a faithful 10-meter operator. WTB is on from Mary Esther. UTR, ERR, and MS keep MARS Net akeds. VCB is working 20-meter c.w. HJA is busy with mobile rig. QK changed final amplifier tubes. DAO is on 75 meters. UQZ keeps 20-meter c.w. hot. ART is on 144 Mc. WN4YRF keeps akeds with his brother in Mississippi. PQW keeps constant monitor on 29,560 kc, with vertical polarized antenna for the mobile gang. ODO is active again. BFD is on all bands. VR has invisible antenna. WN4UYS made Technical Class. JPD has had ICI (intercom interference). NOX-NYZ received a visit from a Korean veteran for whom they handled traffic. Traffic: W4GQM 9, MS 3.

**GEORGIA**—SCM, James P. Born, Jr., W4ZD—New officers of the Augusta Radio Club for 1953 are CBH, pres.; OKL, vice-pres.; SIQ, secy.-treas.; EFB, act. mgr. The Confederate Signal Corps has formed a c.w. Novice net which meets at 0830 EST on Sun, and 2000 EST on Wed, on a frequency of 3735 kc. YEK is NCS and WIX is Alternate NCS. YEK requests Novice stations interested to send her a radiogram or drop a card to 572 Wells Avenue, Hapeville, Ga. WRV is the new EC for Cobb County. WDW has moved to Connecticut. IMQ has returned to the air with a Vizing II. EJN now is on 3.85-Mc. 'phone with a pair of 4-126As. The Camp Gordon Radio Club of Augusta now has a membership of 260. EPM has a new mobile rig on 3.85-Mc. 'phone. EOK has a new 28- and 14-Mc. beam and is looking for DX. The Kennehochee Amateur Radio Club's hamfest will be held May 31st at Lithia Springs, Ga. A Johnson Viking II will be given to some lucky attendant. KL still is looking for DX. However, he finds time to do an FB job as OO. Our new Route Manager, MTS, thanks all of you for interest and cooperation in the c.w. nets and would like to have your ideas and suggestions for improving net operations. Avoid loss of appointments; check your endorsement date now. A few appointments are now available; a note to your SCM will bring full details. IU now is OO Class II and can give precise frequency checks. Traffic: W4USA 1595, K4WAR 824, W4EJC 107, ZD 39, MTS 36, MA 15, OPE 4.

**WEST INDIES**—SCM, William Werner, KP4DJ. SEC: HZ. 75-meter 'phone activity is increasing with many new stations reporting to AREC Net. Navy Radio Club: W4JBC/KP4, is awaiting assignment of KP4USN. The Governors-to-President message was obtained by HZ and forwarded to W4NTZ. IS now has a Globe King on all bands. RD has a Globe King for 75-meter 'phone. PJ is assembling Viking II. RK built a steel tower for the beam. LK is building 829-B all-band final. WP4TP now is a KP4 on 10 meters. New stations reporting to the 10-meter AREC Net are TO, TP, TZ, MP, OW/m, and DV/m. DV is building s.s.b.c. rig. CP has new 80-meter folded dipole. GN has 813 working OK now. UB is building three-element 7-Mc. beam. UW blew final plate transformer. PT, a newcomer on 75, uses Viking transmitter. RC has new QTH in Rio Piedras. HX is in the hospital with ulcers. RK is translating the history of amateur radio in Puerto Rico from Spanish to English with the permission of UPR. Ex-W6CYX, now BU, souped up BC-348. FW is using Viking and HRO-60. KV4AA reports to the 3559-kc. Net using a new kilowatt. AK is on 1899 kc. CP uses 150-B from home QTH and BC-610 from WXR.F. DJ has clamp tube modulating 813. HN has new 75A-2 receiver. OW has 10-meter mobile on 29,645 kc. VP9AV and VP9BO visited San Juan. CX is back after several years. CI mobile, in Ponce, is heard consistently across the island on 3025 kc. MS is readying kw. for 75 meters and installing mobile in new Oldmobile. KD is on 75-meter 'phone. KV4AI reports to the 392-kc. Net AZ, consistency on 20, has been heard 75 meters recently. BV blew out TB850. Traffic: KP4CP 64, DJ 21, DV 3, HZ 1, RK 1.

**CANAL ZONE**—SCM, Nelson W. Magner, KZ5NM—KZ5HC/MM, Capt. Kurt Carlson on the *Flying Enterprise II*, QSOed more than 30 KZ5s while in Canal Zone waters Jan. 13th and 14th. KZ5WA was elected president of CZARA; other officers are BJ, vice-pres.; BM, secy.; JD, treas.; TB, act. mgr. WM and BD, operating mobile, accompanied 20 Boy Scouts on an overnight hike over jungle roads while their XYLS stood by every hour throughout the night to maintain contact. RV is the new EC for the Pacific Area; he was the first to QSO KZ5HC/MM and also was the first to QSO WZZX/M on the *Flying Enterprise II*. The Montione mentioned in Dec. was BD's, not IA's. AW replaced his dipoles with a long wire to work 3.5-, 7-, 14-, 21-, and 28-Mc. c.w. DE has a new Viking. RT has a new 8X-71. QA rebuilt his VFO and is rebuilding an 829-B final. NN is visiting OA-Land. Traffic: KZ5AA 956, ML 122, WA 42, TB 33, DG 22, FL 16, BY 12, JQ 9, AE 8, RM 7, RV 3, KA 2.

### SOUTHWESTERN DIVISION

**LOS ANGELES**—SCM, Samuel A. Greenlee, W6ESR—Asst. SCM: Kenneth L. Kime, GK8X. PAM: QR. RMAs: FMG, FYW, GJP, JQB. Section Traffic Nets: LSN, Mon. through Sat., 3600 kc, at 2030. ECN, Mon. through Fri., 3655 kc, at 2030. This is the last report by your conductor. Your new SCM, XVJ, will take office in April but meanwhile will function as Acting SCM. I know you will give

(Continued on page 114)

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(Continued from page 118)

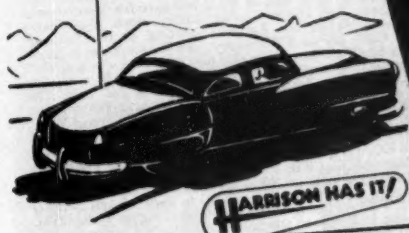
him the same magnificent cooperation you have given me — to keep the section on top! BPL this month was made by K6FCA, W6GYH, HK, KYV, and VHN. KLD is rarin' to go on RTTY. An FB traffic team is PWZ and PXC (XYL). MU reports new officers of 50 Club: MU, chairman; RW, 1st-sec; and CMN, Bd. of Dir. Pat on the Back Dept. To JE, the DA of S.L.O. County for drafting original bills, etc. in our fight for call-license plates. EPL still is working on surplus gear. COZ says that JMY is on 75 with ARC-5, QE is sporting FB modulation meter; FKH is back on the air after an illness; SGF is Viking-II-ized; CCD got the nod from Uncle Sam. CAK conducts code classes for beginners at J. Burroughs H. S., Burbank, Mon. and Wed. at 1830. Contact him. New c.w. traffic man in LQZ — good, too! FYW, RM, says CMR dropped the "N" in his call. BLY reports that YUY again is a proud papa; that patience award should go to JQI and SPR for working on 2-meter RTTY; FAN (CEA's XYL) monitors 3925 kc. (Whittier Emerg. Net frequency) — handy for net and for keeping tabs on the OM: Radio 50 Club (Whittier) new officers are LVQ, proxy; CAU, KHP, YUY, and WQL on the Board. CK is going full blast after a recent illness. LYG is ready to go on 40-meter phone. GEB is QRZ. College NCA is running out of anchors to keep VFO from drifting. Top-this-one Dept.: CDU is organizing 146.575-kc. section of the amateur traffic net for the Amer. Legion. After licking BCI and TVI he now has HAI (hearing aid interference) with a neighbor going nuts hearing voices. HIL MBU has new Elmao for mobile, as has ESR. ENR is getting precision gear for frequency checking. NJU really is DXing with new Viking II. IHD is completing new 75/80 rig. BHC holds down more skeds! EBK has FB mobile. YCF says that ENR and NKT had 30 hams at their joint birthday party. DPL says CNA is now on 2. GJP's new kw. is about ready to go. New club: West (SF) Valley RC, meets the 2nd Mon. For information call GIO or break the net on 29.052 Mc. Mon. QR (PAM) says MTN's 2-meter net has a heavy traffic load on 145.090 Mc. at 1930 daily. AREC Notes: Eastern Sierra Net (formerly Owens Valley Net) obtained surplus Div. of Hwys. radio gear — further augmenting facilities of this fine outfit (per WWT, EC). San Bernardino Net (HKD, EC): This big outfit is on 5 nights weekly with heavy check-ins on 145.6 and 29.3 Mc. Whittier Emerg. Net (BLY, EC) reports average check-ins of 25 on 10 and 2; CAU, LVQ, and FAI are doing an FB job there. Daylight Emerg. Net (ONI, EC) reports consistently heavier check-ins, noon Thurs., on 146.8 Mc. Burbank Emerg. Net (CW8, EC) is building new e.d. Control Station; Glen Area Net (OKN, EC) has new Control Center with 5 operating consoles and master monitor position, a mighty efficient layout. West Valley (GIO, EC) has a big turnout Mondays at 2000 on 29.052 Mc. Los Angeles (AOP, EC) is delighted with the fine AREC/o.d. cooperation. IWX, EC/liaison e.d., announces Region 9 Control — PMJ, and operates Mondays on 2, 75, and 80 with a staff of 21 hams. Thanks for reports from CFL, CMN, EBK, GEB, and YVI. Traffic: W6KYV 2851, K6FCA 1081, W6HK 707, GYH 601, VHN 516, HLZ 114, FMG 109, LYG 86, BHG 83, GJP 83, YBF 68, BLY 64, WRT 63, PMS 57, NTN 56, FYW 40, CAK 35, DPL 30, ESR 29, LQZ 24, NCA 23, YCF 14, PWZ 11, CK 9, HIF 8, HKD 7, MU 6, NJU 5, COZ 4, CBO 3.

ARIZONA — SCM, Albert Steinhilber, W7LVR — Asst. SCMs: Kenneth P. Cole, 7QZH; Dr. John A. Stewart, 7BX. SEC: OIF. RM: JGZ. Arizona Phone Net: Tues. and Thurs., 7 p.m., 3865 kc. Arizona C.W. Net: Mon., Wed., Fri., 8 p.m., 3515 kc. Phoenix Net: Tues. and Thurs., 7 p.m., 29 Mc. Tucson Net: Nightly, 8 p.m., 29 Mc. Arizona 6&2 Net: Nightly, 7 p.m. Arizona MARS: Tues. and Thurs., 9 p.m., 4025 kc. Arizona Restricted Speed Net: Mon., Wed., Fri., 8 p.m., 3700 kc., 8-12 w.p.m. Phoenix had another successful picnic at South Mountain Park attended by ACD, 6BBM, BKJ, CPY, GJFD, JOK, JYH, KJT, KOY, KUJ, KWB, LID, LQB, MAE, MAL, MWQ, NKO, OIF, OQS, OUE, OYC, PMQ, PUP, QWO, QZP, RIJ, RYP, SHR, SWV, and UDI. Tucson OPRC dedicated its Meade W. Powell Memorial Station, W7GV, in the new Red Cross Building, in memory of the late Meade Powell, the first licensed amateur in Arizona. Present were Mrs. Meade Powell and daughter, who presented the equipment. A simulated emergency, with the station as NCS, was demonstrated to the public with mobiles and fixed stations. The following participated: AIA, DRQ, HUV, LLO, LVR, MLL, MOB, NYK, NRP, PEF, PLM, QCO, QCR, QHD, QHT, QWU, RDB, RTC, SIC, and SSO. Phoenix sponsored another Dons Trek to Superstition Mountain, with communications in charge of JYH, OIF, and UDI. PLM is new Tucson EC. QZH and SX are building mobile rigs. RFE has all-hand vertical. ACD moved to Phoenix. Traffic: W7FLM 192, QFQ 147, KOY 31, LVR 20.

SAN DIEGO — SCM, Edgar M. Cameron, jr., W6FHH — Asst. SCMs: Shelley E. Trotter, 6BAM; Richard E. Huddleston, 6DLN; Thomas Walls, 6EWU. SEC: SK. Asst. SECs: WYA, FOP. RM: MUE. EC: DEY. Activity was keynoted by all-out civil defense organizing and anti-TVI effort. SK is doing a superb job as SEC with WYA, FOP, and DEY right in there at his side. SK presented LRH and HLB with Asst. EC certificates before a group of 40

(Continued on page 116)

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**BODY MOUNTS.** Spring swivel base. With coax connector.  
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**BUMPER MOUNTS.** 140 \$6.55 140X—Heavy duty.....\$7.65  
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**STAINLESS STEEL WHIP.** 96" long. Treaded 3/8" stud.  
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**All-Band Mobile Antennas**  
Complete with one coil (specify). Fits 3/8 SAE thread. Less spring mount.  
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40 meter coil. AB/W40.....Each \$8.75  
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**2-Meter Coax Antenna**  
140 to 170 mc. Waterproof, polished chrome finish. With 10 ft. of 72 ohm coax cable. Supplied complete.  
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**Model HI-Q 20 meter coil.** Heavily plated 1/8" solid copper wire. Weatherproof plexiglas housing. Removable threaded plastic nylon end-caps.....\$8.95  
**Model HI-Q 75 meter coil.** Two pie-wound coils; powdered iron-core slug. Easily adjustable to exact inductance. Simple installation. \$7.95



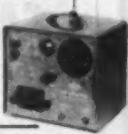
### SHURE CARBON MIKE



Ideal for mobile. Clear, crisp voice response. High output. Heavy duty switch for push-to-talk operation. Output level 5 db below 1V. for 100 microramp speech signal. With hook for suspension and bracket for wall mounting, plus cord cable. **SHURE Model 102C..... \$16.17**

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### GONSET "SUPER 6" AMATEUR CONVERTER

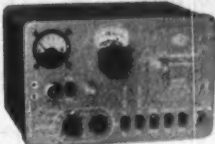
Covers 10, 11, 15, 20, 40 and 75 meter phone bands with plenty of bandspread. Also 49 and 19 meter SW broadcast bands. High sensitivity on 8-ft. whip. High-low impedance antenna switch for 40 and 75 meters. RF gain switch and separate broadcast antenna input jack. With tubes.....\$52.50

### ELMAC 50-WATT VFO TRANSMITTER

Ideal for under-dash or fixed station operation. VFO or crystal control on all bands. Bandswitching on 10, 11, 20, 75 meters. Additional switch position for 160, 40 or 6 meter coil. Use only two controls to QSY! Dial calibrated for all bands. Built-in pi-antenna matching network. Push-to-talk! Needs 400 to 300V. DC @ 225 ma, plus filaments. 7 1/2"x7 1/2"x12".  
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Same as above for dynamic or crystal mike.....\$149.00  
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**"Commander"**  
**TRANSMITTER**  
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Multi-band model featuring high "Q" high output final. Range: 1.7 to 54 mc continuous. Small enough for under-dash mounting. Universal input for any standard carbon or high impedance dynamic or crystal mike. Matches any antenna. With tubes (6AG7, 6146, 12AT7, 2-6AQ5), and plug-in final coils 10 thru 80 meters. 5 1/2"x8"x7". Requires: 300V. DC @ 200 to 225 ma (phone) and 6.3V. AC or DC @3.15 amps.....  
**VFO UNIT.** Exceptionally stable and compact. Cable plugs into "Commander.".....\$29.95

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OMe and XYLs. UDU, local RI., also was present. Appointments of LRB and of HLB will give SK needed help in northern San Diego County AREC work. Certificates were awarded at the January meeting of the Palomar Radio Club. From PRC prexy, HAW, we hear a warm thanks to all for attending this all-important c.d. and club reorganization meeting. HLB foresees trouble with the Palomar Club's 3-kw. F.D. generator — flat tire! The high school gang at IAC is getting fun and FB training on "Escobinet," meeting at 1900 on 3702 kc., Tues., Wed., Thurs., with alternating NCS duty. All are invited to check in. Recent Novices-to-Generals at IAC are OXT, QBN, and KKC. IWQ made Advanced Class one day before the deadline. AKY, LRB, FVA, BLL, and FJH are active in county AREC nets on 3.825 and 29.5 Mc. Sun. and Tues. Confirmed v.h.f. man CDQ checks in regularly on 2-meter circuit. FUY is losing hair over the A-5 rig at Vista QTH. BLL and FJH visited the famous Coronado Club gang. It is an FB bunch with a top-notch anti-TVI program and a pair of FB leaders in OCJ and OQY. Hearty thanks from all to EWU for doing a great job as Acting SCM. Your new SCM truly hopes to be able to live up to the standards set by Ellen White and Tom Wells. Asst. SCM DLN joins FJH in voicing the mutual pride of the section for W1s YYM and WPO, now at ARRL Headquarters. Traffic: W6IAB 5122, ELQ 414, MUE 100, IZG 31, FCT 8, CHV 6

## WEST GULF DIVISION

**NORTHERN TEXAS** — SCM, William J. Gentry, W5GF — Asst. SCM: Thomas B. Craig, 5JQD. SEC: QHL RM: BKH. PAM: IQW. CVW has a new sky wire up. SRQ made 1365 points in the CD Party. MK is going back into the Air Force soon. PIZ is out of the Navy and is a student at E.T.S.T.C. LGY is trying to get another emergency rig on the air. We sincerely regret to report the passing on of Aubrey W. Williams, MRR. Sure glad to hear from CF again. JQD has a new transmitter on 75-meter 'phone now. WBU is on 40- and 80-meter c.w. now. TDR/5, ONA, SRQ, ARK, RRM, BKH, CF, USA, TFB, TFY, K5FBP, and K5FKF did some nice message-handling at the World Theater. PZU has a new beam up. TYX has a Class A ticket now and also is reporting in on the New Mexico VI's MARS Net. The South Plains Amateur Radio Club is setting up an assembly line for hand-talkies. BVG is back from Korea and is active on 14-Mc. c.w. WHG is a new ORS. Traffic: W5BHK 296, PAK 161, SRQ 134, CVW 74, RRM 72, CF 52, VRX 44, CWE 42, ARK 38, UFP 15, LGY 12, ROH 6, GF 4.

**OKLAHOMA** — SCM, Jesse M. Langford, W5GVV — SEC: AGM. RM: MQI. QGD resigned as RM because of business and MQI accepted the appointment. MQI is located in Oklahoma City and operates both phone and c.w. TKC, TMY, and EHC put on a demonstration of amateur radio operation for a church group. Aro Center ARC had a "Boiled Owl" meeting, with all-night operating. TFP is active on all of the Oklahoma nets. KY now is operating with cathode-follower modulation. The number reporting traffic has picked up and inquiries regarding appointments are coming in each day. We need FAMS for each of the amateur bands and the boys who are working v.h.f. should apply for OES appointment. VBQ has moved to Idaho. State Civil Defense certificates were presented to the members of the AREC in Tulsa. The Canton Club has found the ARRL quizzes very interesting and informative. The Pioneer Radio Club has started a campaign to relieve the TVI situation by news articles in the local paper and the use of a TVI committee. The Enid Club has a 3½-kw. generator for use in emergency operation. All amateurs should check their emergency equipment and make sure that it will be ready for the coming tornado season. Traffic: W5GZK 366, ROZ 127, SWJ 86, MRK 68, OQD 55, MQI 53, MFX 46, JQK 38, PML 34, GVV 32, GVS 30, KY 30, QAC 22, ESB 14, EHC 9, QVV 8, ADC 7, SVR 7, ITP 6, TFP 6.

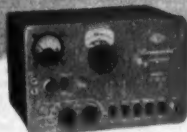
**SOUTHERN TEXAS** — SCM, Dr. Charles Fernagliach, W5JFF — Southern Texas does it again! In the recent Governor-to-President Relay the Texas Governor's message was the first to arrive. Your SCM, JFF, gave the job to NZE, of Austin, to make arrangements. He arranged for the message from the Governor and got GQ to handle it. The starting time was 4:00 P.M. and the message was on the way one second after 4:00 to NF, one of the official pick-up stations. It was confirmed at 4:07 P.M. The contact was made on 20 meters. Thanks to NZE and GQ for their splendid work. MN is one of the men who send in a report every month. I know you all enjoy seeing the dope on your friends and seeing your call mentioned. I must depend on getting a card from YOU to make up this report, so please drop me a line by the first of each month. QFA reports that they are trying to start a RACES Net in Corpus and expect to have it in operation soon. All radio operators of the National Guard XXI Corps are fast becoming hams. They are W5YKD, W5WKL, W5SWTT, QH0, RSJ, GFJ, LSE, RVI, NOT, and SSE. As you all know we are host to the nation's hams at the ARRL National Convention to be held in Houston, July 10-11-12. JFF is the general chairman. This is one experience none of us should miss. All of the big wheels will be down and there will be talks on

(Continued on page 118)



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### Gonset 3016 "Commander"

All-band phone-CW xmitter for under-dash mount. Covers 1.7 to 54 mc continuously. With plug-in coils for 80, 75, 40, 20, 15 and 11-10 meters. Up to 50 watts input on CW, 35 watts on phone. Complete with tubes and 2 plug-in coils; less crystal, mike and key. Requires 300 v. DC at 200-225 ma and 6.3 v. at 3.15 amps. Shpg. wt., 8 lbs. **98-041. Net. .... \$124.50**

**VFO 3020 Tuning Head** for VFO control on 75, 20, 15 and 10 meters. Shpg. wt., 3 lbs. **98-042. Net. .... \$29.95**

### "Super-Six" Converter

Covers 75, 40, 20, 15, 11-10 meters, and 19 and 49 meter bands. For use with any 1430 kc receiver. Supplied complete with tubes. Shpg. wt., 5 lbs. **94-913. Net. .... \$52.50**



### Babcock MT-5A D-X Mitter

Deluxe mobile transmitter; 2 ranges, 3.5-7.3 mc, 14.0-39 mc; covers 80, 40, 20, 15, 11-10 meters. Choice of 4 crystals, 2 in each range. Easily modified for CW. 35 watts input with power supply below. Use with single-button carbon mike. Requires 425 v. DC at 250 ma., 6 v. at 2.75 amps. With tubes; less mike and crystals. Shpg. wt., 12 lbs. **98-791. Net. .... \$99.50**

**PS-4A Mobile Power Supply.** Operates from 6 v. DC. Shpg. wt., 15 lbs. **98-792. Net. .... \$67.50**

**LS-1 2-Band Antenna Tuner.** Use with 8-ft. whips. Easily pre-tuned for 10 and 75 meters. Built-in 6 v. relay selects proper section of tuning unit. Shpg. wt., 7 lbs. **98-793. Net. .... \$15.00**  
(12 v. DC equipment also available)



### RME MC-55 Converter

5-band coverage: 10-11, 15, 20, 40, 80 and 75 meters. High sensitivity; 3-gang tuning; noise limiter; 4 tuned circuits in IF output. Complete with tubes, cables, underdash brackets. Requires 150-250 v. DC at 30 ma and 6.3 v. at .92 amps. Shpg. wt., 6 lbs. **98-032. Net. .... \$69.50**

### RME MC-53 Converter

Similar to above, but covers 2, 6 and 10-11 meters. Complete with tubes. Shpg. wt., 6 lbs. **98-031. Net. .... \$66.00**



### Sonar MR-3 Receiver

Ideal compact mobile set covering 3.5-4.0 mc, 14-14.4 mc and 26.9-30 mc (80, 75, 20 and 11-10 meters). Unusual sensitivity, 1 mv for 1 1/2 watt of audio; ANL; BFO for single side-band reception; temperature-compensated oscillator; edge-lighted dial. Very rugged construction. Requires 200-300 v. at 60-100 ma and 6.3 v. at 2.4 amps. Coax antenna input. Complete with tubes and universal mounting bracket. Shpg. wt., 6 lbs. **98-781. Net. .... \$89.95**

### MOBILE ACCESSORIES

**Dow Coax Relays** for coax antenna changeover. Handle up to 1000 watts. Simultaneously operates external SPDT switch (below) for opening receiver B+ when transmitting.

**75-798**, for 110 v. AC, **\$10.50**. **75-797**, for 6 v. DC, **\$9.50**  
**75-799**, SPDT Switch. Actuated by relay, **\$1.00**

**Electro-Voice Carbon Mike.** Response 100-4000 cps. Output, -50 db. With 5-ft. cable. **99-587. .... \$9.70**

### Johnson Viking Mobile Kit

Up to 60 watts input on 75, 20 and 10 meters. Complete bandswitching; gang tuning; 4-position crystal selector, additional position for external VFO; output matches 52-ohm coax. For use with any type mike. Requires 600 v. DC at 200 ma, 6.3 v. at 3.75 amps. All parts and cabinet supplied; less tubes, crystals and mike. Shpg. wt., 16 lbs. **98-056. Net. .... \$99.50**

### Elmac A54 Xmitter

For mobile or fixed station. Up to 50 watts input, phone or CW. For 80, 75, 20, 11-10 meters. VFO and Pierce crystal osc. Requires 6 v. at 4.5 amps, 500 v. DC at 225 ma. With tubes; less crystals and mike. Wt., 17 1/2 lbs. **98-084. For carbon mike. Net. .... \$139.00**  
**Model A54H.** As above, but for use with crystal or dynamic mike. **98-085. Net. .... \$149.00**  
**PSA-500 Power Supply.** Delivers 375 v. DC at 250 ma, 6.3 v. AC at 5 amps. For 115 v. 60c. AC. 19 lbs. **98-086. .... \$39.50**

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**CPO-130 Codemaster.** As above, but without built-in speaker. **73-045. Net. .... \$12.94**

#### Gonset "Communicator"

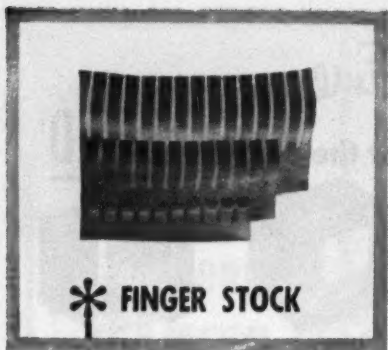
Complete 2-meter Amateur phone station in one portable case—for battery or AC operation. Puts you on the air with a 15-watt AM phone xmitter; receives with a highly sensitive superhet. Has 19' whip for receiving and xmitting. 10 1/4 x 9 1/4 x 7". Complete with tubes; less mike and 8 mc crystal. For 110-120 v. 50-60 c. AC or 6 v. DC. Wt., 24 lbs. **84-912. Net. .... \$199.50**

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Correct matching will put that lost power into the antenna. The EaZon type 3WA is designed for this purpose. Strong, easy to install and foolproof. Fits RG8/U or any coax of similar dimensions. Weight 4 ozs. Satisfied users throughout the U.S. Types 3W and 4W are ideal junctions for stubs or harmonic traps.

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Type 3W Tee Junction 3.00 Net  
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**NEW MEXICO** — Acting SCM, R. J. Matthias, W0BIW

— The New Mexico amateurs are making another effort to obtain legislation for call-letter license plates. Much work has been done and it is hoped that this time we will meet with success. Band conditions have been better on the N. Mex. 75-Meter Emergency Phone Net, 3838 kc. (Tues. and Thurs., 6 p.m. MST; Sun. 7:30 a.m. MST). The New Mexico MARS Net functions daily at noon, 5 p.m., and 9 p.m. MST. The New Mexico YL MARS Net now meets on Tues. and Thurs. 9–10 a.m. MST, and studies proper procedure. There now are approximately 8 members. A "Spare Parts Auction" was held by the Sandia Base Radio Club, the club receiving 50 per cent of the amount received over the asking price. An interesting talk was given at the Feb. 9th meeting on the subject of "Theoretical Consideration in Antennas" by Norbert J. Gamira. The Mesilla Valley Radio Club recently had a talk by Mr. R. Morris of the El Paso Electric Company on the subject of "Safety," also an interesting color film called "Reddy-Made Magic" covering the discovery of "Reddy-Kilowatt."

## CANADA

**MARITIME** — SCM, A. M. Crowell, VE1DQ — SEC: FQ, RM: OM, EC: EK, Orchids to the Maritime Fone Net, which now meets nightly as a traffic net and really is showing some snappy operating. Seven o'clock AST is the time. HH, ex-VE7YY, now is in Korea. PX is out in VE7-Land. AAG can be heard signing VE3CBS. A report to hand says that DB is going on 'phone. RR is QRP with ATR-5. DQ, IL, RU, and SI have been on 7-Mc. 'phone. SI has returned home from a visit to VE3. ET has changed QTH to the country and is back on 3.7-Mc. 'phone. PQ, WL, OM, and HJ have been on 21 Mc. The HARC executives are considering fund-raising plans for the coming season. PT has resigned as treasurer because of work and has been on 14 Mc. a bit with 'phone. FQ still is handling traffic with the "north." HD has the new mobile going but finds contacts few this time of year. OM reports VQ2A, VQ6N, and VQ6AB now are MTN members. We hear the Sunday A.M. "Fat Man's Club" is active on 3.8-Mc. 'phone. ME and TF have been giving 7-Mc. 'phone a whirl. Sorry to hear that XR

(Continued on page 130)

## THIRD ANNUAL ONTARIO SECTION QSO CONTEST

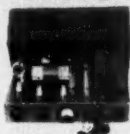
A QSO contest between Ontario section amateurs, sponsored by the Ontario 'Phone club, will be held on two consecutive Sundays, April 26th and May 3rd, 1953, from 10 a.m. to 10 p.m. EST each period.

The purpose of the contest is to enable c.w. and 'phone operators to become more acquainted with both types of operating. Two awards and one consolation prize will be made. The c.w. award will be known as the "Spartan Radio Trophy" and the 'phone award will be known as the "Columbia Record Trophy." Both trophies, donated by Spartan of Canada, will be suitably engraved with the winner's call and the year of presentation. Permanent possession of the trophy will be given to the station winning it on three occasions. After the winners have been selected, the remaining contestants who have submitted logs shall be eligible for a draw prize. Following are the rules: Frequencies from 3500 kc. to 3725 kc. for c.w. operation, 3500 kc. to 3800 kc. for c.w.-to-'phone, 3725 kc. to 3800 kc. for 'phone-to-'phone, 3765 kc. is allotted to mobile 'phone. No multipliers will be used and one point per contact from 'phone-to-'phone, 'phone-to-c.w., and c.w.-to-'phone, provided the contacts are made in the portion of the band above designated. Exchanges will be, contest number, call report and time. Any station may operate 'phone or c.w., provided his operation takes place in the proper portion of the band. Stations may be worked only once regardless of type of emission. One contestant cannot win both trophies. "CQ VE3 Contest" will be the general call. The contest committee will judge the affair, and their decision will be final. Contest logs are to be sent to S. Moir, P.O. Box 191, Simcoe, Ontario, and must be postmarked prior to midnight May 10, 1953.



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### TRANSMITTER KIT

This is an ideal unit for the novice. Very simple to assemble. New, revised circuit to

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**\$64.95**

MD-40 modulator kit for above... **49.95**

MD-40P as above but with power supply..... **59.95**

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### Model SRT-120 Transmitter



For mobile and fixed location operation. Has band-switch for 80, 75, 40, 20, 15, and 10 or 11 meters, plus spare position for any future band. Has provision for two crystals or external VFO head. Final amplifier employs the new Amperex 9903/5894A tube. Power input is 120 watts on CW, and 100 watts on phone. All circuits metered. Power requirements: 600 volts dc at 350 ma, and 6.3 volts at 6.4 A. Complete with Tubes..... **\$198.50**  
External VFO Head..... **19.50**



### The New Model DB-23

### RME PRESELECTOR

Radically new in design, the DB-23 increases communications receiver efficiency by providing an average overall gain on all amateur bands from 3.5 through 30 mc. of approximately 25 db. Controls include: 'on/off' band selector and antenna peaking. Band selector, when set at 0-position, provides through-coupling of antenna to receiver directly. Employs unique 3-tube, broad-band, low noise circuit. Power supply is self contained.

Dimensions: 5" high, 7 1/4" wide, 6" deep. Cabinet: Blue-gray steel.

Complete with tubes..... **\$49.50**

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### "COMMUNICATOR"

A complete two-way station for 2 meter-band operation. Suitable for mobile or fixed location use. Receiver is a sensitive superheterodyne with built-in noise clipper circuit and 68Q7 Cascade rf stage. Transmitter uses 2E26 in final 15 watts input. Employs 8 mc. crystals for stability, and has a range of over 100 miles. Operates on either 110 volts AC or 6 volts DC. Weight approx. 16 pounds. Complete with Tubes (less crystal and microphone)..... **\$199.50**

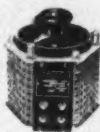


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Type 10, 1.25 amps.....	<b>\$ 8.50</b>
20, 3 amps.....	<b>12.50</b>
116, 7.5 amps, table mtg.....	<b>23.00</b>
116U, 7.5 amps, panel mtg.....	<b>18.00</b>
1126, 15 amps.....	<b>46.00</b>
1156, 45 amps.....	<b>118.00</b>

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### Brand New WESTON RF AMMETER Model 425

3 1/2" dial, non-glass. Range: From 0 to 2.5 amps. Special..... **\$8.95**



### The New ELMAC PMR 6-A

### Portable Mobile Receiver

A complete 10-tube dual conversion, communications receiver. Provides coverage of 6 bands from 10 to 80 meters as well as broadcast and 160 meter band.

Other features include: High Selectivity . . . Built-in noise limiter . . . Built-in BFO . . . Thermal-Compensated Oscillator . . . Panel-controlled A V C 'on/off' switch. Designed for 50-ohm antenna. Power requirements: 6 volts AC or DC at 3.3 Amps, and 250 volts DC at 90 mA. Dimensions: 4 1/2" high, 6" wide, 8 1/2" deep. Weight: 6 1/2 lbs.

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### Brand New Specially Priced DYNAMOTORS

CARTER	Input Voltage	Output Voltage	Output Current in ma.	SPECIAL PRICE
	5.5	600	270	<b>\$35.00</b>
	5.8	375	325	<b>35.00</b>
	5.8	600	175	<b>29.50</b>
	12.3	375	325	<b>39.50</b>

WESTINGHOUSE	Input Voltage	Output Voltage	Output Current in ma.	SPECIAL PRICE
	5.8	375	325	<b>35.00</b>
	6.0	600	270	<b>35.00</b>
	5.75	410	275	<b>35.00</b>

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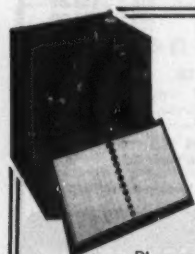
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Please write, giving complete  
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(Continued from page 118)

has been on the sick list. Traffic: (Jan.) VE1FQ 148, VO6N 86, GU 64, VE1OM 43, VO6M 32, VE1LY 18, VO6AB 5, 6R 3. (Dec.) VE1OM 93, VO6M 20.

**ONTARIO** — SCM, G. Eric Farquhar, VE3IA — The Kitchener-Waterloo Radio Club and the Hamilton ARC now occupy new club quarters. Possibly the biggest news of the month was the announcement by the Department of Transport permitting Canadian hams the use of 7200 to 7300 kc. for 'phone. This became effective Jan. 12th and no time was lost getting on. Terrific QRM has been experienced on this segment for nearly two years by the c.w. boys from foreign broadcast stations. Feb. 20th at our W-Land cousins joining this part of the band with 'phone. It will be interesting to see if foreign QRM can be overridden by the high-power fraternity. We understand the v.h.f. boys had a get-together in Oakville during the month, but no information was received on same. It's a girl at the QTH of DFE. Congratulations! AVS completed the modulator and now awaits the R.L.'s blessing. To ATR, possibly this section's most consistent "reporter-inner" to traffic nets, goes our hat-raising effort. During the past year Reub, averaging four nets per night, reported in 1466 times. Lack of material regarding activity in this section makes this report rather short. Please let your doings in our hobby be known to your representative who, from time to time, gets a blast for not mentioning more happenings. NG reports the Nottown Amateur Radio Club was on as VE3BRR at the International Hobby Show, Toronto, in February. Traffic: VE3WY 192, ATR 181, IA 127, BUR 115, DCZ 97, NO 74, IL 40, BMC 33, GI 32, AUU 15, DU 10, BSF 9, VZ 9, DQA 5, OJ 3, VD 2, AVS 1.

**QUEBEC** — SCM, Gordon A. Lynn, VE2GL — TA is active on 88N on 7280 kc. daily at 1230 and on QEN at 1100 Sun. on 7275 kc. WW has worked 49 countries on 21-Mc. c.w. and 13 on 'phone, and on 40-meter 'phone has worked all VE call districts except 6, XE, and all W call districts, these being 'phone-c.w. contacts. LO finds PQN slow but still holding together. DR reports having fair success on 40-meter 'phone. ACD now is mobile on 75 meters with a.c. alternator on his car. UZ is VE3CWN and is in Three Rivers. BK reports he still is battling with TVI but that the exciter now is clean. BB is back on with a new rig with phase modulator. IS is rebuilding his rig into a shielded console. CA reports his activity confined to week ends because 20 meters is no good evenings. He had OX3BH as a visitor. Traffic: VE2CA 49, DR 23, EC 10, LO 8.

**ALBERTA** — SCM, Sydney T. Jones, VE6MJ — YD has erected a new antenna and is on 3.75-Mc. 'phone with good signals. AO was a recent visitor to Edmonton and worked mobile with the local gang. WC, who has done some good work on the Maple Leaf Net, is a new ORS. HM, FB, CP, I.Q. and MJ have been working 40-meter 'phone since the opening of this band on Jan. 12th. YZ, at Fort Chipeyan, is a new ORS and is Alberta contact on Trunk Line "I." YM has recovered from a spell of illness. OD advises that the Alberta Phone Net will meet at 1830 Mon., Wed., and Fri. ZR has moved to a new QTH. ZA is working on antenna tuner. EY has a new job at the "Mac." This monthly report is made possible only through your reports to your SCM on or before the 7th of each month. Reports have been few in the past months. Let your SCM know what you are doing. His address? See page 6 of any QST. Traffic: VE6HM 100, OD 4, YM 4, MJ 3.

**MANITOBA** — Acting SCM, Leonard E. Cuff, VE4LC — It is with the deepest regret that I have to report the death of our SCM, Arthur W. Morley, VE4AM, at the Winnipeg General Hospital Jan. 23rd. He is survived by his widow Jean, VE4JM, and two children. Our sympathies go out to the family in this very sad loss. DU has put in 61.6 modulators and also has built new 6-meter receiver and 100-ke. crystal-control frequency standard. CU is heard quite consistently on 20-meter c.w. H8 has constructed new grid-dip meter and 6-meter receiver. DI is going strong on 6 meters and has new NC-57 receiver. IM, ex-3CDJ, at St. Boniface, has SX-71 receiver and is running 5 watts to a 6AQ5 final and a half-wave doubler on 40-meter c.w. He also is building new 813 final. GO is on 20-meter c.w. with 100 watts to pair of 807s and modulated with a pair of 807s in Class AB2. HT was a recent visitor to Winnipeg. MX and JN took part in the Brandon Bonspiel recently. RK has a bad limp caused by dropping a transformer on his foot. AO is to be heard these days on the 75-meter 'phone band. AP is on again with what he calls WWT (World's Worst Tone). NN, our friendly R.L., has been transferred to Regina. TN has left us for greener fields down in the State of Oregon. Traffic: VE4HL 86, KN 12, FE 8, DU 2, ER 2.

**SASKATCHEWAN** — SCM, Harold R. Horn, VE5HR — ADVANCE NOTICE. The Official Saskatchewan Hamfest will be held at Lake Waskesiu. Proposed dates are June 28-29. More information in the next issue and over Official Bulletin Stations. Plan now to attend; a good time is assured all attending. Because of poor conditions activity was low during the month and nets suffered badly. NS has a new rig running 60 watts on 80 meters. EH is rebuilding modulator using a pair of 813s with a pair of 814s in the final. HR changed to an 814 in the final. GI and WH were

(Continued on page 122)



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W6ARA

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## HENRY RADIO STORES

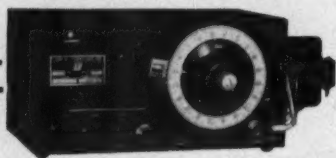
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**Type 205 FM Modulation Meter.** Indicates peak modulation deviation. Tunable, 25 to 200 MC. Meets FCC mobile specs. Weight 12 lb. Width 12". Price **\$240.00.**

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in charge of communications at Fort Qu'Appelle Civil Defense School and did an FB job despite conditions. EX is heard on 75-meter 'phone after a long absence. MN moved to Saskatoon, adding another mobile rig to the list. GM is a new call heard from Carrot River. MY has a new NC-183. 7-Mc. 'phone is proving to be a good 'phone band and should relieve congestion on 75 meters and provide longer hauls for daylight hours. Our sympathy goes to Mrs. Morley and family on the passing away of VE4AM. Art did a fine job as SCM, was a consistent net station, and will be missed by all. Traffic: VE5TE 28, PJ 20, HR 10, GO 4, LU 2.

### ARRL Appointments:

#### OFFICIAL RELAY STATION

Throughout the history of amateur radio, the c.w. traffic-handler has carved for himself an enviable niche. Traffic-handling has brought high credit to all stations engaged. Early ARRL recognition of the public service and dedication to properly systematized procedures created the Official Relay Station post as the first and basic ARRL appointment.

Today ORS appointment is the most popular of all station posts in the field organization. If you enjoy operating c.w. and consistent traffic and net operation, here is something really worth while.

What is it going to cost you? Learning and using standard ARRL operating practices (proper message form, ending signals, abbreviations) . . . keeping a transmitter and receiver in operating condition at all times . . . reporting monthly to your SCM . . . ability to handle the code at 15 w.p.m.

What are you going to get in return? The greatest single benefit is probably the development of operating ability and know-how. You'll find that there's a great deal of satisfaction to be had in being able to efficiently check in on your traffic net and handle your station properly. There's fraternalism in net operating with a group

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of top performers. The opportunity to be a part of the ARRL field organization is yours. We get more fun and accomplishment as part of an operating team, not from going it alone in casual work. Added to enjoyment is the privilege of participation in the quarterly CD Parties. Late news and operating aids from Headquarters go along with your appointment.

Where can you apply for an Official Relay Station appointment? Your SCM is the one to contact. You'll find his name and address on page 6 of any QST. He'll be glad to help you.

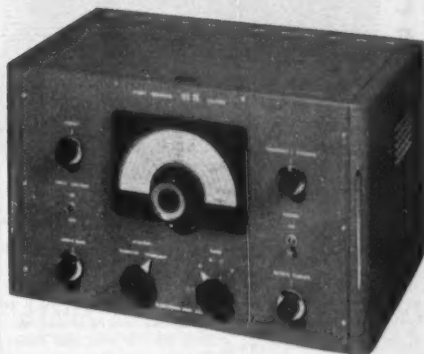
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### Single Sideband Exciter SS-75

Check these specifications and you'll see why the SS-75 is now the one piece of equipment that places all the advantages of single sideband at your finger tips:

- ★ Built-in stable VFO, with voltage regulation.
- ★ Carrier injection to receiver antenna terminals... tune in SSSC signals the same as AM, no other gadgets necessary.
- ★ Illuminated VFO tuning dial provides 31 inches of band-spread 3800-4000 KC in 4 bands, with 5 to 1 gear reduction.
- ★ Built-in voice control and receiver disabling circuit. Also provides for break-in CW operation.
- ★ Specially designed crystal filter network for maximum stability and reliability.
- ★ Carrier injection to transmitter available for working single sideband WITH CARRIER, for tune-up adjustments, or CW.
- ★ 10 watts output, with additional 807 socket for up to 100 watt operation with external power supply.
- ★ Handsome grey crackle cabinet, chrome trimmed, 20" x 12" x 12". Complete with 12 tubes, including one 807, operating manual. .... \$245.00
- Frequency conversion mixer for 40-20 meters, rack mtg. 3 1/2" x 19" less power supply. .... 75.00



**ELMAC-A54 Under-dash Mobile Xmtr.**



### WRIGHT T-R SWITCH

For break-in operation on CW, AM, or SSSC. Use one antenna for transmitting and receiving. It's instantaneous! No moving parts, no power needed to operate. Coax fitting for connections to feeder and receiver will handle 1 Kw. With 75 meter plug-in coil. . . **\$9.95**

Extra coils **\$1.75** per band



### LIMITED QUANTITY

RGB/U coax, 12", plug each end. ....	<b>\$.70</b>
831 SP standard coax plug. ....	<b>.60</b>
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3-gang heavy 365 mmf variable. ....	<b>.60</b>
4-prong steatite socket. ....	<b>.15</b>
110V. relay, DPST 20 Amp contacts. ....	<b>5.95</b>
15 Henry, 50 Ma. filter choke. ....	<b>.59</b>

### PHOSPHOR BRONZE AERIAL

125 ft. of the finest aerial wire obtainable. 42-strand phosphor-bronze with linen center. Will not stretch, very high tensile strength, diameter approximately same as No. 14 copper, very flexible. Excellent for transmitting or receiving antenna, control cable, guy wire. Regular list \$4.95. .... **90¢**



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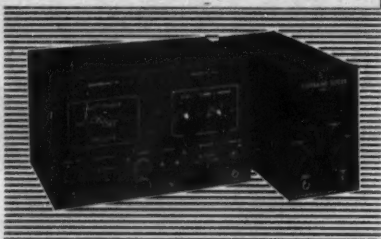
### 8/8/8 MFD. 500 V. D.C.

Triple 8 mfd. 500 working volt D.C. oil-filled condenser, common negative, solder terminals, hermetically sealed. 3" x 3 3/4" x 2 1/4" .... **\$1.95**

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## MULTI-BAND OPERATION

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## SIDE BAND

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**MULTIPHASE EXCITER MODEL 10A** (upper left). Approx. 10 watts peak output 160 to 20 meters, somewhat less on 10-15 meters. Will drive beam power tetrodes to more than 1 KW input from 20 to 160 meters. **SWITCHABLE SSB**, with or without carrier, double sideband AM, PM, break-in CW, **VOICE OPERATED BREAK-IN** and receiver disabling, it's **ALL BUILT-IN** to this truly versatile exciter. Built-in power supply also furnishes blocking bias for linear amplifier and voltage for optional VFO. With internal xtal and coils for one band. Wired and tested \$159.50. Complete kit \$112.50. Extra coil sets for \$3.95 per band.

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Plug your 40 or 80 meter xtal into the **MULTIPHASE EXCITER** for break-in CW operation. Later it's an excellent voice exciter, for use with your General Class ticket. No expensive high-level modulator required.

**SIDE BAND SLICER**

**MODEL A RECEIVER ADAPTER** (upper right). Improves any receiver. **SWITCHABLE** upper and lower sideband reception of SSB, AM, PM and CW. Cuts interference and heterodynes in half. Eliminates distortion caused by selective fading. Works into any receiver having 450-500 KC IF. Built-in power supply. Use a Model A Slicer — notice the "holes" in even our most crowded bands and hear signals you have never heard before. Wired and tested \$74.50. Complete kit \$49.50.

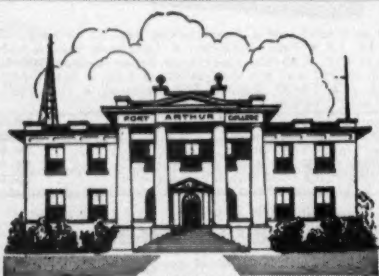
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## Meteor Scatter

(Continued from page 15)

### Signal Strength

The strength of the meteor-scatter signal, and hence its usefulness in ham communication, will depend on the efficiency of the stations involved. The antenna system is very important, and should be designed to concentrate power where the most meteor scatter is taking place — namely, in the *E* region over the mid-point of the great circle path. For an 800-mile path, the main lobe of the pattern in the vertical plane should ideally be at 6 degrees above the horizontal. At 20 meters a dipole should be 165 feet over perfectly-conducting earth, for the lowest lobe to be at 6 degrees! In practice, whatever arrangement affords the highest gain consistent with a low vertical angle will be best.

Almost any good station will be able to take advantage of meteor-scatter transmission at 20 meters. At 15 meters, however, it is probable that only the kilowatt boys will be able to transmit a usable background signal over the path. Stations having good locations and rotary beams (or preferably rhombics), and willing to use maximum receiver crystal selectivity, will no doubt be able to make a go of it. (As frequency goes up, echo strengths and durations go down, but since the echoes are exponential, the net loss can be overcome by an increase in power or receiver sensitivity.) In any case, a c.w. clipper or limiter will be very worth-while. Otherwise, when gain is advanced enough to copy weak passages, meteor bursts tend to be deafening.

Note that the preceding remarks on signal strength apply to those times of day when meteor scatter is the *only* form of transmission taking place. Actually, for much of any given day the signal will be well above the purely meteor level. Any sporadic-*E* activity, for example, will enormously increase the strength of the received field. (During one memorable test with W7PZ, sporadic-*E* set in and within a minute or so transformed his randomly-fading S1 meteor-scatter transmission into a rock-solid S9 signal with a very slow, almost perfectly sinusoidal amplitude variation.) Whenever any *F*-layer transmission is in at all, of course, there will be a strong ground back-scatter component present along with the meteor-scatter.

Thus the timetable for 14-Mc. transmission over a New York-Chicago path, during the winter months of the year, might run something like the following:

8 P.M. — 7 A.M.	meteor scatter alone	weak signal
7 A.M. — 9 A.M.	meteor plus <i>F</i> -layer ground scatter	medium signal
9 A.M. — 5 P.M.	direct <i>F</i> -layer transmission	very strong signal
5 P.M. — 8 P.M.	meteor plus <i>F</i> -layer ground scatter	medium signal

(Sporadic *E*, which might come in at any hour

(Continued on page 186)

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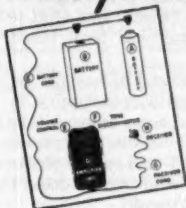
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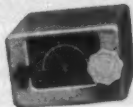
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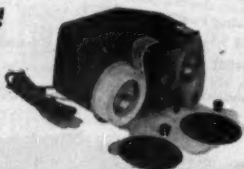
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of the day or night, would provide a strong signal directly, or a weaker signal via ground scatter.)

### Commercial Stations

The reader is probably wondering, at this point, why meteor-scatter propagation has not previously been noticed on transmission from commercial stations. The answer is that it probably has, but simply was not identified as such. Most broadcast or commercial stations are in the habit of signing off after *F*-layer transmission fails, so listeners seldom get much of an opportunity to hear meteor scatter. Once in a while a station, transmitting according to a prearranged schedule, will stay on the air after its frequency has "gone dead." This has happened, for example, in the case of a 17-megacycle short-wave broadcasting station roughly two hundred miles south of Palo Alto. Their beam points right at Stanford, on its way to the Orient, and what is believed to be meteor scatter has been heard on many occasions.

WWV's transmissions on 15 and 20 megacycles, of course, provide a wonderful opportunity to check for meteor scatter, and hams living within a radius of 1000 miles of Beltsville, Maryland, are urged to tune in on WWV and satisfy themselves that the 20-meter band really doesn't go entirely dead, at night, after all!

### Acknowledgment

The authors are indebted to W6VUW, W6UGL, W6LLK, W6AOF and other members of the Stanford Radio Club for assistance during the tests. The help of Larry and Clayte at W7TMK is also appreciated. The loan of recording equipment belonging to a joint-Service-sponsored research project is gratefully acknowledged. The photograph of meteors during a shower was taken by L. A. Manning, W6QHH.

## YL News & Views

(Continued from page 53)

who works ten LARK members. Send members' calls and dates and frequencies of the QSOs to Gladys, W9MYC. The LARK now meet at 1400 CST on Wednesday (10 meters) each week, except the first week of the month when they meet at 2200 CST on Tuesday.

April eleventh is the date of the semi-annual W1 YL Luncheon (YLRL members and nonmembers alike). The place is the Smith House in Cambridge, Massachusetts. Write Helen Wright, W1UPZ, P. O. Box 126, Brookline 46, Mass., for further information.



Wava Harlan, W8FPT, is the YLRL District Chairman of the eighth call area. First licensed in 1950, Wava is active on 10, 20 and 75. Her OM is W8EAM. Since the start of her term last July, Wava regularly has sent postcards to each of the licensed YLs in her district, in quest of information and news. Other DCs who follow this practice find it's worth the little extra time and effort.



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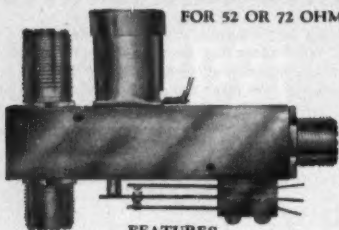
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## Folded & Loaded Antennas

(Continued from page 27)

### $\lambda/32$ Monopole

(Eignt integrals)

$$R_{\frac{\lambda}{32}} F = \frac{R_{\frac{\lambda}{32}}}{32} B L = 0.3 \text{ ohm.} \quad (9)$$

### Top- and Bottom-Loaded $\frac{\lambda}{8}$ Monopole (Fig. 5)

In this case the far-field factor is twice the cosine integral from 0 to  $\frac{\pi}{8}$ . In calculating the impedance, however, we

must divide by the square of the cosine of  $\frac{\pi}{8}$  or 22.5 degrees, since we are feeding at a point 22.5 degrees from the current loop. This is similar to the case considered in equation (5). Therefore,

$$R_{\frac{\lambda}{8}} TBL = 30 \left( \frac{2 \int_0^{\frac{\pi}{8}} \cos \theta d\theta}{\cos^2 \frac{\pi}{8}} \right)^2 \quad (10)$$

$$= 30 (0.830)^2 = 21 \text{ ohms.}$$

### $\frac{3\lambda}{4}$ Folded Dipole (Fig. 7C)

The far-field factor for this case is found by calculating the difference between the cosine integral from 0 to  $\frac{3\pi}{4}$  and the integral from  $\frac{3\pi}{4}$  to  $\frac{3\pi}{2}$ . This figure is 2.414 and from this the impedance of the folded  $\frac{3}{4}$ -wave dipole comes out to be about 420 ohms.

## 'Phone Receiver

(Continued from page 34)

usually encumbered by the time constants in the a.v.c. circuit. In this receiver, a.v.c. is applied only to the two i.f. amplifying stages, so the blocking bias is applied to all other stages: r.f., mixer, and the i.f. branch stages. The latter circuit has only a few 0.01- $\mu$ f. r.f. by-pass condensers involved, so its time constant is quite short. Normally, an external bias is applied when it is desired to cut the receiver off. If this is not available, however, the first r.f. grid will rectify the incoming signal and produce enough bias to cut off all the other stages and silence the receiver. Meanwhile, the a.v.c. detector experiences no signal because its branch amplifier is cut off, so the receiver comes back with full life the instant the transmitter is turned off.

## Conclusion

It is, of course, a pleasure to have in the shack a receiver that within itself is capable of doing the full job for reception of all kinds of 'phone signals in a crowded band. At the same time it has been a refreshing experience to reaffirm the notion that with time and thought the amateur can still do as well or better than his commercial brethren. Try building your own "dream" receiver; you'll enjoy it.

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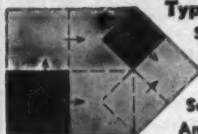
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## High-Power Mobile

(Continued from page 28)

system and a subsequent linear amplifier. Although this involved a few problems not normally encountered in mobile work, we feel that the result is more than satisfactory.

As can be seen from the circuit diagram in Fig. 1, the low-level r.f. section uses one triode of a 12AU7 as a Pierce crystal oscillator and the other triode as a neutralized plate-modulated stage. For good quality, a crystal microphone is used with a 6CB6 speech amplifier ahead of the 6AQ5 Class A modulator. A volume control wasn't found to be necessary, so none is included. The 10,000-ohm dropping resistor and 10- $\mu$ f. by-pass condenser are necessary for 100 per cent modulation in a choke-coupled (Heising) circuit like this, and checks with a 'scope showed the modulation to be linear and complete. A 6AL5 with both sections in parallel is used as a negative peak clipper, and a small audio filter (0.25-henry choke and three condensers) completes the circuit.

A Class AB<sub>1</sub> linear amplifier follows the modulated stage, and we feel that this line-up has certain advantages, contrary to misunderstandings in the past. Although the efficiency of the final amplifier is not as high in this application as it would be if a Class C stage were modulated, the limit here is the total power available from the power supply, not the input to the final stage (as it might be in a home station). It can be shown that the transmitter in Fig. 1, which puts out a carrier of 220 watts, draws less total power than a high-level system giving the same carrier output. So far as compactness of the r.f. and audio systems is concerned, there is just no comparison, as a look at the photographs will prove. It must be admitted, however, that we took advantage of the small size of Eimac 4X150As and of Jennings vacuum condensers to obtain this small package. A variable vacuum capacitor, C<sub>3</sub>, is used for tuning, shunted by a fixed vacuum capacitor, C<sub>2</sub>. This latter condenser helped to suppress harmonics and parasites.

Forced air cooling is required with the 4X-150As, and a small d.c.-motor-operated blower is used for this purpose, as can be seen in the photographs. The radio noise from the motor brushes was quite a problem at first, but a two-section r.f. filter cleaned up the "hash."

### Antenna

As has been mentioned before in QST,<sup>1</sup> corona discharge from the tip of the whip is a problem in high-powered mobile operation. We licked it with a 3-turn wire basket fastened to the tip of the whip. The wire was about 1/4 inch in diameter, and the finished sphere was about 1 1/4 inches in diameter.

At this power level the center loading coil in the antenna is likely to heat, and our first at-

(Continued on page 138)

<sup>1</sup> Leavenworth, "75-Meter Mobile, California Style," QST, Jan. 1952.

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Order No. Q36-095	\$42.00
Gonsset "Super-Six"	
Order No. Q36-295	5.25
Hallcrafters S-38C	
Order No. Q36-045	4.95
Hallcrafters S-53A	
Order No. Q36-064	9.00
Hallcrafters S-40B	
Order No. Q36-052	12.00
Hallcrafters S-76	
Order No. Q36-046	17.95
Hallcrafters SX-71	
Order No. Q36-199	22.45
Hallcrafters SX-62	
Order No. Q36-061	29.95
Hallcrafters SX-73	
Order No. Q36-198	97.50
Hammarlund HQ-129X	
Order No. Q36-390	23.95
Mallard M3B Converter	
Order No. Q36-523	5.26
Morrow 2BR Converter	
Order No. Q36-510	5.50
National SW-54	
Order No. Q36-141	5.00
National NC-125	
Order No. Q36-043	14.95
National NC-163D	
Order No. Q36-038	36.95
National HRO-60	
Order No. Q36-125	48.35
RME VHF-152A	
Order No. Q36-070	9.70
GONSET 2 METER XMTR-RCVR.	
Order No. Q35-147	18.95

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Mr., Model No. and Order No.	DOWN PAYMENT
Collins 32V-3	
Order No. Q35-001	\$77.50
Eldico TR-75 KIT	
Order No. Q35-137	6.50
Eldico TR-1TV KIT	
Order No. Q35-139	38.00
Eldico MD-40 KIT	
Order No. Q35-134	5.00
Elmac Mobile A54H	
Order No. Q35-200	14.90
Gonsset "Commander"	
Order No. Q35-145	12.45
Hallcrafters HT-20	
Order No. Q35-107	44.95
Harvey-Wells TBS-50C	
Order No. Q35-161	11.15
Harvey-Wells TBS-50B	
Order No. Q35-162	13.75
Johnson Viking II KIT	
Order No. Q35-120	27.95
Johnson Viking Mobilkit	
Order No. Q35-122	9.95
Stancor ST-203A KIT	
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The KW-1 transmitter provides 1600 watts input on the 80, 40, 20, 15, 10 and 11 meter bands; 500 watts on 160 meters. Only 4 tuning functions required in operation: band-switch selection, frequency setting, PA tuning and PA loading. All the latest circuit improvements — TVI elimination, multiple tuned circuits etc. Equally efficient for voice or CW. Power input 115/230V 60 cycle, single phase grounded neutral. Grey wrinkle finish cabinet, 28 x 18 x 65 1/2". Ship wt. 610 lbs. Order No. Q35-011 .....\$850.00

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167 Washington St., Boston 8, Mass.

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Complete mobile package — nothing else to buy. Outstanding mobile signals use MOTOROLA equipment — backed by years of communication equipment experience — world's largest producer of 2-way mobile equipment.

A mobile transmitter with a double feature FM or AM at flip of the switch, the MOTOROLA FMT-30-DMS (27-30 MC.) . . .	1325 Master Mobile stainless steel soring — Double Tapered . . .	<b>\$10.75</b>
<b>\$130.00</b>	New Gon-set Tri-Band Spread Converter . . .	<b>\$47.60</b>
MOTOROLA P-69-13 or 1B-ARS receiver with special noise limiter for use with any converter having 1440-3000 KC. . . .	Gon-set "Super 6" Converter . . .	<b>\$52.50</b>
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100/96" Master Mobile Whip Antenna . . .		<b>\$5.25</b>

The above comes complete with all necessary accessories and mounting hardware. Order direct or through the Motorola National Service Organization member in your area.

NOTE: This Receiver and Transmitter is equipment which has been returned from the field, modified and rebuilt for Amateur Service.

Above units subject to State and Federal Excise Tax where it applies.

For further information write to:

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Amateur Sales Dept. Q57 — April

1327 W. Washington Blvd. Chicago 7, Illinois  
Attention: Harry Harrison, W9LLX, Tel. Taylor 9-2200 Ext. 161



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tempts were no exceptions. A high-Q coil was finally obtained from W6LXA that did the trick nicely, and we ended up with a 5-foot whip above the coil and a 5½-foot section below the 1-foot long coil.

### Tuning

The low-level portion of the transmitter needs no comment here, because it is similar to any other a.m. rig using Heising modulation. The linear amplifier will be handled a little differently than you are used to, however, and a few comments are in order. To obtain upward modulation, the antenna coupling is tighter than one is used to with Class C operation. The linear is first coupled for maximum antenna current, and the coupling is then increased until the antenna current drops down about 20 per cent. This is no particular trick, since the high-C tank makes it easy to couple to the load. When the antenna is properly coupled, the grid current on modulation peaks should never be allowed to exceed about 1 ma., if distortion is to be avoided. When trouble-shooting this rig, we found only three basic reasons why the output wasn't linear:

- 1) The grid bias does not remain constant.
- 2) Too much grid drive is used.
- 3) The antenna is not coupled tightly enough.

### Operation

Having a high-powered mobile has allowed us to carry on successful communication where low power is inadequate. Our best DX in daylight is over 500 miles, with excellent signal strength. This is hard to duplicate in our valley with 1-kw. fixed stations. On one occasion we were parked near a fixed station of comparable power and 300 miles away the signal was 1 S-point better than that from the fixed.

## Governors — President Relay

(Continued from page 45)

Georgia: W4MZO-W4ZD-W4CAK-W3HVL.  
Idaho: W7IWU-W3CVC.  
Illinois: W9KQL-W3PZA.  
Indiana: W9LZI-W9TT-W3JZY-W3QZC.  
Iowa: W8AUL-W3CA-W3QZC.  
Kansas: W0KSY-K4USA.  
Kentucky: W4TFK-W4TUT-W4BAZ-W3FQB.  
Louisiana: W5NG-K4USA.  
Maine: K1NAI landline to W1RUO-W1PTL-?W3NOE.  
Massachusetts: W1BB-W3PZA.  
Michigan: W8SCW-W3PZA.  
Minnesota: W8UCV-W8MXC-W8CGK-W3CA-W3QZC.  
Mississippi: W5NPO-W3CIC.  
Missouri: W0DSO-W3OMN.  
Montana: W7IVY-W3PFO.  
Nebraska: W8VYX landline to W8JDJ-W8AUJ-K3WBB-?W3O8X-W3CLY.  
Nevada: W7ZT-W3BHV.  
New Hampshire: Message originated twice: W1APK-W3CA-W3ECP, W1APK-W2FKN-W3TNA.  
New Jersey: W2ZI-W3QZC.  
New Mexico: W5KCW-K4USA.  
New York: No message filed. Message from W2GTI indicated that repeated attempts had not met with success.  
North Carolina: W4SGD-W3OMN.

(Continued on page 134)

# HITTING THE HIGHWAYS and AIRWAVES!



**ELMAC Model A-54** Wired for 10, 11, 20, 40 and 75 meters. Only \$143.00

**Model A-54H.** Same as above but for crystal or dynamic mike. Only \$153.00

**MORROW 5 BAND CONVERTER Model 5BR.** Covers 10, 11, 15, 20, 40, 75 and 80 meters. Only \$74.95

**ELMAC New Mobile Receiver Model PMR-6-A.** Dual conversion, 10 tubes, BFO, noise limiter, covers all amateur bands, 10 through 160 meters plus BC band. Measures only 4½" H. x 6" W. x 8½" Deep. Only \$134.50

**MASTER MOBILE All-Band center loaded mobile antennas** with coil for one band (20, 40 or 75 meters). Only \$8.57. Extra coils for above bands. Only \$3.23 each

**CARTER GENEMOTORS.** Furnish "B" power for mobile transmitters. Small and compact. Model 450AS. 6 volts at 29 amps input. 400 volts DC at 250 MA output. Only \$45.68

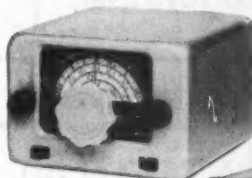
**Model 520AS.** 6 volts at 28 amps input. 500 volts DC at 200 MA output. Only \$46.46

**MALLARD New Mobile Antenna Base Loading Coil for 40 Meters.** Model HI-Q 40 Coil. Only \$7.95

**STANCOR Model ST-203A 10-11 Meter Kit.** (Simple conversion instructions for other bands.) Only \$47.50. Wired and tested. Only \$66.75

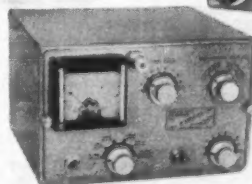
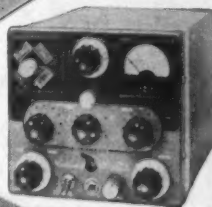
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**GONSET SUPER 6 CONVERTER.** Covers 10, 11, 15, 20, 40, 75 meters plus 19 and 49 meter BC bands. Only \$52.50

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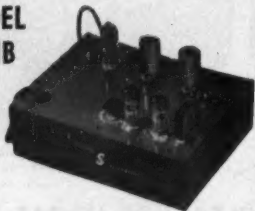
City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

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MODEL  
RC-1B



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(Complete, with power supply, crystal and all tubes)

Converter for any one band, complete with built-in power supply, crystal, tubes, output cable and input fitting for 52, 75, or 300 ohm line, \$45. Now available at leading distributors. Specify band and input impedance when ordering.

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## SENSATIONAL TVI NEWS!

We guarantee TVI suppression and absolute compliance with FCC requirements on harmonic radiation. Not a miracle, but all the tried and true methods, made easy to apply, and it works every time!

Use the Gotham Shielded Cabinet, an all-steel, 20 pound, 13" x 24" x 16" shielded cabinet designed for only one purpose: elimination of TVI. The Gotham Shielded Cabinet makes it possible to apply all the TVI steps easily and quickly.

No alterations on your present rig, no loss of resale value, no danger of damage, no paint scraping—in a few minutes your rig is completely shielded and you are testing for TVI. REMEMBER: IF YOU DON'T CLEAN UP YOUR TVI, WE REFUND IN FULL.

Full step-by-step instructions are included. End the bugaboos of FCC notices, quiet hours and disgruntled neighbors with the Gotham Shielded Cabinet. TRY IT AT OUR RISK. MONEY BACK IF YOU ARE NOT SATISFIED.

**HOW TO ORDER:** Send check or money order for \$12.95 and we will ship promptly by Railway Express, charges collect.

Note: The Gotham Shielded Cabinet is for transmitters smaller than 13 x 24 x 16. If your rig is bigger, send dimensions for special quotation.

**GOTHAM HOBBY** 107 East 126 Street  
New York 35, N. Y.

North Dakota: W0HWD via W0GJJ-W0SSW-W2BO-?. W3MCG-K4USA.

Ohio: W8APF via W8YEW-W3QQS.

Oklahoma: W5CKQ-K4USA.

Oregon: W7DAA-W7BA-K5WAC-K4USA.

Pennsylvania: W3ADE-W3FQB.

Rhode Island: W1WSY-W1SJO-W5BTB-W4NFD/3-K4USA.

South Carolina: W4DMX-W4ANK-W4NF.

South Dakota: W0UVL-K4USA.

Tennessee: W4AEE-W3OMN.

Texas: W5GQ-W4NF.

Utah: W7JPN via W7JVA landline to W7UTM-W4IMH-W3ECP.

Vermont: W10AK-W3FQB.

Virginia: W4JHK-W4LW-W4NF.

Washington: No message filed. Repeated attempts by W7FWD and W7FLX met with no success.

West Virginia: Two separate originations reported. W8EVR-W3OMN. W8HZA-K4USA.

Wisconsin: W9CBE-W3FQB.

Wyoming: W7HRM-W3CVE.

Canal Zone: KZ5WA-W4RYE-K4USA.

Puerto Rico: Two separate originations reported: KP4KD-W3JHW-W3QZC, KP4HZ-W4NTZ-K4USA.

Virgin Islands: KV4AA-W3IL.

### Miscellaneous Observations

W2ZI can well be proud of his personal file of GPR messages (attached to the original Governors' message) representing his activity in all 7 relays. . . . The Delaware message followed closely by the Texas message was the first GPR message received and confirmed in the Washington area. It was received from W3HC by W3AKB and duly confirmed by 5:05 P.M. EST, with Texas greetings arriving at 5:07 P.M. EST. W5GQ and W4NF did the FB job on the Texas message via 20-meter 'phone. . . . W9TT, manager of Trunk Line "J," reported that it was a miserably poor night, but good operators on the eastern end made up for the bad conditions. . . . W3QQS reversed the order of events for his participation in this year's GPR. In 1949, he originated the Ohio message. This year, W3QQS (ex-W8BKE) handled the Washington end of the Ohio message. . . . W7IWU, Idaho SCM, has his usual short trip to obtain his Governor's message. He lives just across the street from the Idaho Governor. . . . Due to the unusually long-skip conditions prevailing, the Arizona GPR message got to Washington the hard way; Arizona to Georgia to Virginia to Illinois, and then to Jeanne, W2BTB, in New York whereupon it was put into the Washington area. . . . W8SCW says he never felt as much like a DX station as when he heard the response to his "CQ Washington de W8SCW, GPR." The longest GPR hop was from California, W6CIS/6, to W4KFC. Of the two military commands relaying congratulations in the relay, the 5th Air Division in French Morocco relayed their best wishes from French Morocco to Washington, via W2BTB in New York. This was the longest single hop reported among the congratulatory messages received.—E. W.

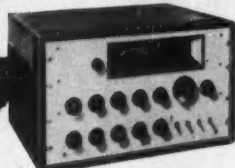
### Strays

W3ODU/1, operating W1AW on 75 'phone, had consecutive contacts with W4NN, W2YY, W8CCC and W8IL. (!)

# Now at NEWARK THE NEWEST IN HAM EQUIPMENT

## THE LATEST FROM hallicrafters

### THE New HT-20



#### HT-20 TVI SUPPRESSED MULTI-BAND TRANSMITTER

A complete new transmitter that incorporates all the Hallicrafters ingenuity and craftsmanship and practically eliminates "TVI" interference. Covers 160-10 meters. Delivers clean signals on both phone and CW. Power output for AM is 100 watts; for CW—115 watts. Uses bandswitching exciter and continuous-tuning final amplifier. All spurious outputs are at least 90 db below rated output. All control leads are filtered thoroughly. Pi-network tank circuit is followed by 4-section low-pass filter, dial and meter scales are covered with metal screening. 10-position crystal selector switch has additional positions for external VFO. Single meter with 8-position switch checks all stages and provides output tuning indication. Tube lineup: 6AH6 mc. buffer, 6L6 buffer-doubler, 4D32 final amp., 6SL6GT speech, 6K6GT driver, 2-807 modulators, 3U4G L-V rectifier, 2-5R4GY H-V rectifiers, 6BL7 bias rectifier, 6AL5 RF carrier rectifier. Sizes: 20 $\frac{1}{2}$ x11 $\frac{3}{4}$ x16 $\frac{3}{4}$ ". With tubes, cabinet and instructions. For 105-120 volts, 50-60 cycles AC. Wt., 130 lbs. **449.50**

98F022. NET

### MODEL SX-71



#### DUAL-IF RECEIVER

A top-notch receiver. Has double superheterodyne circuit above 4.6 mc to provide extra selectivity and image rejection. Includes Narrow Band FM reception, as well as AM and CW. Provides continuous AM reception from 538 kc to 35 mc, and 46 to 56 mc. Five-range selector covers: 538-1650 kc, 1600-4800 kc, 4.6-13.5 mc, 12.5-35 mc and 46-56 mc. Built-in limiter and balanced detector stages for hiss-free Narrow Band FM reception. Double conversion (2075 and 435 kc IF channels) gives image rejection of better than 300 to 1 at 28 mc. One RF, two conversion, and 3 IF stages yield high gain for sensitivity in the order of .7 microvolt. 2 $\frac{1}{2}$  kc selectivity with 11 tuned circuits. Audio peaked for communications frequencies, with 3 watt output. Has extra-wide dials for Main and Bandspread tuning. Controls: 3-step Crystal Filter with Phasing; RF; AF; Tone; BFO On-Off/Pitch; Limiter; Send/Receive Switch; AM/Narrow Band FM Switch. Has universal antenna input, "5" meter, 500-ohm speaker output, phone jack, external power socket and remote send/receive terminals. Circuit uses: 6BA6 RF, 6CA oscillator, 6AU6 mixer, 6BE6 2nd conv., 3-65K7 IF, 6H6 ANL—delayed AVC; 6SC7 BFO/1st audio, 6AL5 detector and 6K6GT audio output. Also has VR150 regulator and 5Y3GT rectifier. Satin black cabinet with chrome trim, hinged top. Size, 18 $\frac{1}{2}$ x8 $\frac{1}{2}$ x12". For 105-125 volts, 60 cycles. With tubes, less speaker, **224.50**

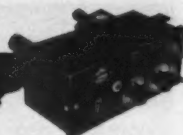
98F008. Shpg. wt., 33 lbs. NET

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**NEWARK**  
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### MARMAX



#### MODEL MT-52 TRANSMITTER

Compact multi-band mobile or fixed phone-CW transmitter. Tube complement: 1-6AG7, 1-6Q6GT, 1-12AU7, 1-6J6. Power requirements: 2.9 amperes @ 6 volts DC. Peak power rating of final stage: 50 watts. Size: 3 $\frac{1}{2}$ " high, 8 $\frac{3}{4}$ " wide, 9" deep. With tubes and 10 meter coils. Wt., 2 lbs. **79.50**

97F190. NET

### POLICALARM



#### MODEL PR-31

Covers 30-50 mc. For police, fire and emergency calls. Superhet circuit uses ratio detector for quiet operation under "no signal" conditions. Sensitivity better than 10 microvolts. Drift compensated. With 5" speaker. Requires 6 to 8 ft. vertical wire antenna. Walnut plastic cabinet, 11x6x6". 110-120 v., AC-DC. Shpg. wt., 8 lbs. **44.95**

98F101. NET

### NATIONAL



#### MODEL SW-54 RECEIVER

Outperforms receivers twice the size and twice the price. Covers entire frequency range from 540 kc to 30 in 4 bands. Police, Foreign, Amateur and Ship bands clearly marked. Unique plastic bandspread dial is adjustable to assure logging accuracy over entire range. Built-in speaker. Size, 11x7x7". Wt., 15 lbs. **49.95**

98F316. NET

### LYSCO



#### MODEL 6005 TRANSMITTER

Latest from LySCO—a newly designed all-band TVI-suppressed transmitter. Operates on 160, 80, 40, 20, 15 and 10 meter bands. Temperature compensated. Uses 6AG7 oscillator, 6AG7 buffer, 807 amplifier, 5U4G rectifier. Power input, 35 watts. Black wrinkle-finish steel case, 17x9x11". Wt., 50 lbs. **189.95**

97F040. NET

Just Out!  
NEWARKS NEW  
CATALOG NO. 55



FREE!

(Continued on page 138)



## ON A **SOLID** FOUNDATION!

**B**efore a mason can lay up a brick wall he has to put in several years learning the trade, and so it goes with any calling.

**F**ortunately, the beginner in amateur radio who is aiming for his Novice ticket as the Gateway to Advanced Amateur Radio need not have to contemplate long years ahead before he can enjoy this fascinating and useful hobby and ragchew with the best of them.

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# New Heathkit GRID DIP METER KIT

MODEL GD-1

SHIPPING  
WT. 4 LBS.

**\$19<sup>50</sup>**



Complete unit easily  
held and operated  
with one hand.



A valuable  
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**THE INSTRUMENT FOR HAMS** — has numerous transmitter applications such as pre-tuning, neutralization, locating parasitics, correcting TVI, adjusting antennas, design and many others.

Receiver applications include measuring C, L and Q of components — determining RF circuit resonant frequencies, etc.

Covers the 80, 40, 20, 11, 10, 6, 2 and 1½ meter bands. Complete coverage from 2-250 MC.

Easy one hand, one unit operation. Convenient thumb wheel drive of tuning condenser leaves one hand free for making circuit adjustments. No tuning head and meter with connecting cable to worry about. It's compact — case only 2½" wide x 3" high x 7" long.

All plug-in coils (rack included) are wound and calibrated — no coil winding, drilling, punching, forming or painting to do — all fabrication is complete, and the kit goes together smoothly and easily.

The 500 microampere Simpson meter movement and sensitivity control allow operator to set instrument for easy detection of dips on all ranges. Instrument is transformer operated for safety. You'll like the appearance of this kit with its baked enamel panel and crackle finish cabinet.

Please include postage to cover postal post and insurance for 4 pounds.

**HEATH COMPANY**  
BENTON HARBOR 9,  
MICHIGAN

that the smaller coil, although of about the same inductance, was spaced farther from the sides of the box. The inductance of a coil will also be affected to a certain extent by the presence of shielding or other metal surfaces in the vicinity of the coil. When the shielding on all sides approaches within one-half of the coil diameter, the reduction in inductance may be of the order of 10 to 15 per cent.

## Single Sideband

(Continued from page 51)

For larger shifts, connect the two pins of the crystal holder together and to the negative pole of a 1½-volt battery. Make the crystal the negative electrode of an electrolytic cell, the positive being a piece of copper wire and the electrolyte copper sulphate as before.

"Run the system for a minute or so, wash and dry the crystal, check the frequency and repeat until the desired frequency is reached. This method moves the crystal to a lower frequency and is reversible, so if you go too far you can go back by reversing the polarity.

"Two don'ts are: Don't use more than 1½ volts, and don't use too strong a solution. If you do, a black deposit forms and ruins the performance of the crystal."

Brian reports: trying the scheme as suggested, and he succeeded in moving a Channel 27 crystal 2½ kc. lower. Using a solution of unknown strength, he got a black deposit that lowered the Q of the crystal tremendously. However, cleaning it off restored things to normal, except that one of the connecting wires pulled off the plating in the process. Soldering this lead back on was no fun, Brian admits.

—B. G.

## Sweep-Tube Rig

(Continued from page 38)

amplifier grid current value of 5 or 6 ma. in mind and then adjust the oscillator accordingly.

It is not possible to recommend the antenna coupler connections that will be required for each and every installation. However, recent *QST* articles <sup>2,3</sup> and the *ARRL Handbook* are excellent sources of information on the subject. The operator should remember that the LC ratio of the coupler may be controlled not only by the jumper connections but also by selection of the inductor. In other words, the 7-Mc. coil and high-C may be best in some instances even though the transmitter is tuned to 3.5 Mc. On the other hand, the 3.5-Mc. coil and real low-C may work out best when the rig is set up for 7-Mc. operation.

Although very few TVI preventive measures were included in the design of the transmitter, it has taken the most rugged interference tests in stride. The rig has been operated right alongside a TV set that was tuned to a fringe-area Channel 6 signal. There was a slight bit of interference to the picture at the beginning of the operation, but every last trace of TVI was cleared up by addition to J<sub>2</sub> of those two all important capacitors — C<sub>10</sub> and C<sub>11</sub>.

<sup>2</sup> Smith, "Antenna Couplers for the Novice," *QST*, August, 1952.

<sup>3</sup> McCoy, "An 80- and 40-Meter Antenna System for the Novice," *QST*, February, 1953.



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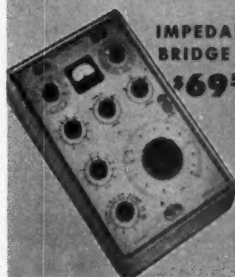
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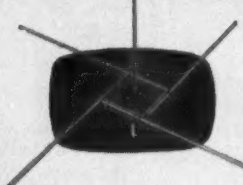
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(Continued from page 65)

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		VE3OJ	14- 7- 1-A
		VE3ATC	96- 24- 2-A

<sup>1</sup> Not eligible for award; more than 1 operator. <sup>2</sup> WN8KLL, operator. <sup>3</sup> Headquarters staff; not eligible for award. <sup>4</sup> W7AXS, operator. <sup>5</sup> W6ZBS, operator.

## R.A.C.E.S.

(Continued from page 61)

While it is all to the good to conduct classes in radio theory and in code looking toward the Novice or Technician Class amateur license (and such licensees may serve very well as operators in RACES), it is noteworthy that for radiotelephone operation the RACES regulations also permit use of any FCC operator license holder except for one or two very restricted types [12.241 (c)].

Probably the easiest of these to obtain is the commercial Radiotelephone Third Class, restricted operator permit. This requires no code or theory test and consists mainly of questions concerning radio laws and regulations that are easily learned by the non-technical radio person such as might volunteer locally for such operator training. Many of them will be willing to have community-owned mobile radio equipment installed in their private cars for use only during RACES drills, tests or in an actual emergency. Others can be useful as operators at fixed or portable stations as demand for operators requires. Close surveillance of these operators will of course be especially required.

EDITOR'S NOTE: The concluding installment of this article will appear in a future issue of QST. It will deal primarily with the crucial topics of funds for equipment and allocation of frequencies.

## Answer to QUIST QUIZ on page 10

Put your money on B. While it is true that the radiation from a perfectly-balanced two-wire line increases as the a.w.r. increases, this effect is completely negligible when the line spacing is small (less than 0.01 wavelength). On the other hand, unbalance in the currents in the two conductors (caused by capacity unbalance to ground, the antenna proper, or nearby objects) can cause feed-line radiation to become a significant part of the total radiation from the antenna system.



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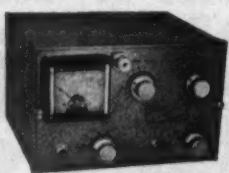
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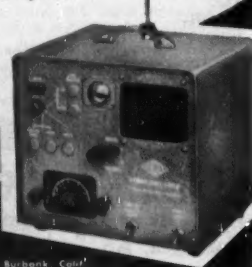
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(Continued from page 63)

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Osmine, N. Y., & vic. (W2P8H) .....	82
Oswego Co., N. Y. (W2ZHU) .....	64
Ottawa, Ont. (VE3OJ) .....	93
Paducah, Ky. (W4JLJ) .....	72
Palo Alto, Calif., & vic. (W6JWD) .....	95
Pampa, Tex. (W5JQ) .....	73
Panama Co., N. J. (W2ZBY) .....	188
Pike Co., Petersburg, Ind. (W0QID) .....	26
Pittsburg Co., Okla. (W5BGC)* .....	109
Pittsfield, Mass. (W1IZN) .....	122
Puyallup, Wash. (W7GWK) .....	58
Quebec, Que. & vic. (VE2QN)* .....	254
Racine, Wis. (W9BZL) .....	107
Raleigh, N. C. (W4HUW) .....	169
Richmond Boro., N. Y. (W2VKF) .....	162
Ridgewood, N. J., & vic. (W2CGJ)* .....	149
Roswell, N. M., & vic. (W5ZU)* .....	181
Rutherford, N. J. (W4DRA) .....	144
Rutland, Vt. (W1AVP) .....	106
St. Louis, Mo. (W9RCE)* .....	409
St. Paul & Ramsey Co., Minn. (W0HKF) .....	182
San Mateo Co., Calif. (W6QIE) .....	774
Sarasota Co., Fla. (W4LMT)* .....	51
Sauk Co., Wis. & Area (W9NLA) .....	86
Schenectady, N. Y. (W2GTC) .....	73
Shohomish Co., Wash. (W7BLX) .....	202
Sonoma Co., Calif. (W6LOU) .....	135
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Southbridge, Mass. (W1EFC) .....	85
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Trumbull, Conn. (W1JSC) .....	100
Trumbull Co., Ohio (W8ANN) .....	184
Trussville, Ala. (W4PPK)* .....	40
Tucson, Ariz. (W7NYK)* .....	161
Tulsa Co., Okla. (W4JBX) .....	165
Tuscarawas Co., Ohio (W8MEI) .....	54
Ulster Co., N. Y. (W2VP) .....	57
Umatilla Co., Ore. (W7BDN) .....	103
Vanderburgh Co., Evansville, Ind. (W0JFJ)* .....	228
Wabash River Basin (W7TT)* .....	168
Waltham, Mass. (W1JSM)* .....	79
Washington Co., Okla. (W8CKT) .....	88
Waunau, Wis. (W9VHA)* .....	193
Wayne Co., Ind. (W9MUR) .....	73
Wayne Co., N. Y. (W2VEY) .....	53
Whittier, Calif. (W6BLY) .....	133
Wilkes-Lincoln-Taliaferro, Ga. (W4PGV) .....	25
Will Co., Ill. (W9MTW) .....	207
Windham Co., Vt. (W1AZV) .....	36
Windoor Co., Vt. (W1ELJ) .....	4
Winnebago Co., Ill. (W9HOA) .....	108
Winthrop, Mass. (W1BB)* .....	213
Worcester, Mass. (W1SPF) .....	120
Wyandotte & Johnson Co., Kans. (W9ZGK) .....	211

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Kenilworth, N. J. (W2LSX)  
Lenox, Mass. (W1DPY)  
Millinocket, Me. (W1KEZ)  
Stearns Co., Minn. (W0BRA)  
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## Communications Dept. Rules

(Continued from page 76)

degree of interest and activity in c.w. relay traffic work, nets and schedules; (b) demonstrate ability to transmit and receive at 15 w.p.m. or higher speeds; (c) follow standard message forms, ending signals, procedures and abbreviations coming under recommended ARRL operating practice and (d) follow exemplary technical and operating procedures such as tune-up using dummy antennas with major adjustment outside heavy operating hours.

The *Official Phone Station* (OPS) appointment shall be granted by SCMs on application to those members meeting the general appointment qualifications, who (a) display interest in major voice communications activities and agree to support section nets and schedules capable of relaying traffic or other practical communications; (b) utilize and follow message and procedure standards recommended by the League when so engaged; (c) employ circuit precautions avoiding overmodulation and frequency modulation on a.m. carriers, and transmitter indicators to detect maladjustments and (d) follow exemplary technical and operating procedures such as tune-up using dummy antennas with major adjustment outside heavy operating hours.

*Official Bulletin Station* (OBS) appointees shall be named by SCMs only in accordance with geographic needs for local coverage, preference being given stations having available considerable amounts of power, and preferably who can demonstrate ability to copy the Headquarters station in advance of receipt of mail information. Applicants must (a) guarantee a minimum of three scheduled transmissions per week; (b) adhere to schedules agreed upon with SCM and (c) return information on current or revised schedules on periodic surveys.

*Official Experimental Station* (OES) appointees shall be appointed by SCMs from among those members active in developing successful communications systems and equipment applications and collecting propagation data in the v.h.f., u.h.f. and s.h.f. amateur bands. This appointment is to be available only to amateurs operating stations on one or more bands above 50 Mc. (a) Applicants shall indicate the problems and experimental projects in which they have continuing interest. (b) Appointees shall report monthly their contacts, observations and progress on the specific problems and communications justifying this type recognition. (c) Stabilized signals, non-radiating receivers and the like shall be used as appropriate to the frequency and mode of emission in accordance with the general progress of development in the designated bands.

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(Continued on page 148)

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show continuing activity and send Cooperative Reports to stations heard radiating spurious emissions in violation of FCC regulations. A.c. notes, unstable signals, overmodulation, parasitics, harmonics, off-frequency signals, illegal broadcasting and other abuses will be made the subject of report direct to the individual concerned. Observers will be classified by the SCM in accordance with demonstrated ability and interest as follows: I. Precise frequency checking (plus or minus 1 kc. at 14 Mc.). II. General frequency checking (plus or minus 5 kc. at 14 Mc.). III. Radiotelephone checks for modulation, stability, quality. IV. Radiotelegraph checks for notes, clicks, chirps and stability, and for radioteletype operation. Observers must possess equipment appropriate to the observing fields to be covered as pre-requisite to appointment. Class I and II Observers must measure *within* their prescribed limits of accuracy on two of four Frequency Measuring Tests run by ARRL each year to retain appointment. New Observers must pass such a test to qualify, all initial appointments otherwise to be made as Class III or IV. Observer appointments will be cancelled for inactivity of three months or more, subject to reinstatement for renewed and consistent activity. Monthly reports through SCMs are required.

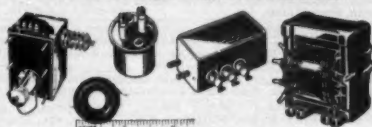
16. Awards will be made and test or contest activities announced from time to time to extend encouragement to individual progress in operating procedures, in the accuracy and speed of making contacts and handling record communications and in furtherance of individual and group ability to render practical communications efficiently. Certifications or awards as recognition for progress and accomplishment in Amateur Radio will also be made under detailed provisions published in *Operating an Amateur Radio Station* or from time to time in *QST*. General operating procedures may be codified with consideration to the practice and suggestions from the field organization. The minimum procedures helpful to clear-cut and efficient operations will be recommended and set forth in *Operating an Amateur Radio Station*.

17. The League list of clubs or appointees must not be made available for commercial solicitation or advertising purposes. SCMs may make available such information to their sub-appointees as is desirable in effectuating amateur organization needs. On petition of an affiliated club or on request of the members signing petitions to nominate for ARRL office, such a list of section or division scope may be furnished.

18. These Rules and Regulations shall have the force and effect of By-Laws of the League. They may be amended as necessary from time to time by the Communications Manager, who shall cause more detailed provisions to be published as needed in the current edition of the League publication *Operating an Amateur Radio Station*. Amendments to the current edition shall be effective on publication in *QST*.

# F R E E D

## TRANSFORMERS



**MILITARY COMPONENTS TO  
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<b>NO. 1150</b> Universal Bridge	<b>NO. 1250</b> Decade Condenser
<b>NO. 1170</b> D.C. Supply	<b>NO. 1410</b> Harmonic Distortion Meter
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In Canada  
ATLAS RADIO CORP., Toronto

**TELEX**  
HEARING AT  
ITS BEST

## HAM-ADS

(1) Advertising shall pertain to radio and shall be of nature of interest to radio amateurs or experimenters in their pursuit of the art.

(2) No display of any character will be accepted, nor can any special typographical arrangement, such as all or part capital letters be used which would tend to make one advertisement stand out from the others.

(3) The Ham-Ad rate is 30¢ per word, except as noted in paragraph (6) below.

(4) Remittance in full must accompany copy. No cash or contract discount or agency commission will be allowed.

(5) Closing date for Ham-Ads is the 25th of the second month preceding publication date.

(6) A special rate of 7¢ per word will apply to advertising which, in our judgment, is obviously non-commercial in nature and is placed and signed by a member of the American Radio Relay League. Thus, advertising of bona fide surplus equipment owned, used and for sale by an individual or apparatus offered for exchange or advertising inquiring for special equipment, if by a member of the American Radio Relay League take the 7¢ rate. An attempt to deal in apparatus in quantity for profit, even if by an individual, is commercial and all advertising by him takes the 30¢ rate. Provisions of paragraphs (1), (2) and (5), apply to all advertising in this column regardless of which rate may apply.

(7) Because error is more easily avoided, it is requested signature and address be printed plainly.

(8) No advertiser may use more than 100 words in any one issue nor more than one ad in one issue.

Having made no investigation of the advertisers in the classified columns, the publishers of QST are unable to vouch for their integrity or for the grade or character of the products or services advertised.

**QUARTZ**—Direct importers from Brazil of best quality pure quartz suitable for making piezo-electric crystals. Diamond Drill Carbon Co., 719 World Bldg., New York City.

**MOTOROLA** used communication equipment bought and sold. WSCB, Ralph Hicks, 204 E. Fairview, Tulsa, Okla.

**SUBSCRIPTIONS**, Radio publications, Latest Call Books, \$3.00, Earl Mead, Huntley, Montana. W7LCM.

**QSL's** SWL's Meade W8KXL, 1507 Central Avenue, Kansas City, Kans.

**QSL's**, SWL's Samples, 106 C. Fritz, 1213 Briargate, Joliet, Ill.

**QSL's** Fluorescent QSL's radiant and glowing with quality-control. QSL's Kromschke three colors and up. Rainbow maps. DX QSL's. Samples rushed, 10¢. Uncle Fred, Box 86, Lynn, Pa.

**QSL Samples** 10 cents. Minner, WISQF Press, Candia, N. H.

**WANTED:** Cash or trade, fixed frequency receivers 28-42 Mc. W9YIV, Troy, Ill.

**QSL's**, SWL's, High quality. Reasonable prices. Samples. Write to Bob Teachout, W1FSV, 40 Elm Street, Rutland, Vermont.

**WANTED:** Marconi multiple tuner, coherer, spark coil, magnetic detector, etc.; DeForest responder, coherer and other early equipment; Marconiographs, Modern Electronics; Electrical Experimenter and early Call Books and text books of wireless. Franklin Wingard, Rock Island, Illinois.

**MICROWAVE** test equipment wanted. Weston Laboratories Inc., of Weston 93, Massachusetts, will make you a high cash offer on any microwave test equipment, particularly such numbers as: TS-13, TS-120, TS-45, TS-35, TS-147, etc. To those more interested in trading, we offer any new standard ham item or a combination of cash. Write giving full description for prompt reply.

**WANTED:** All types of aircraft radio, receivers and transmitters. Absolutely top prices. W2KUU, 308 Hickory St., Arlington, N. J.

**WANTED:** Top prices paid: Navy selayns 1 DG, 1F, 1CT, 5CT, 5D, 5DG, 5G, 6G, 7G, etc. and BC-348, BC1221, AN/ART-13, AN/ARC-1, AN/ARC-3, RTA-1B, AN/APR-4. Electronic Research, 719 Arch St., Philadelphia 6, Penna.

**WANTED:** BC610 or BC610 parts or components. State price and condition by letter. C. Porter, 2545 11th Ave., Silver Spring, Maryland.

**WANTED:** Selayns and syncros. Top dollar paid. Write full descriptions to: Box 84, Babson Park 37, Massachusetts.

**WANTED:** Navy Selayns, types 1DG, 1F, 1G, 1CT, 5F, 5G, 6G, 7G, etc. Autogyro: AY-1, AY-101D, AY-201, etc. Tubes, test equipment, Signal Corps Equipment. Send List. Top prices. Electro, 110 Pearl St., Boston, Mass.

**QSL's** Samples free. Big 18 page catalogue, 25¢. "Brownie," W3CJ1, 3110 Lehigh, Allentown, Penna.

**GONSET** Triland Converter, new factory sealed cartons, guaranteed. Special, \$39.95. Variety Electric Co., Inc. 468-70 Broad St., Newark 2, N. J.

**QSL's** by Petty, W2HAZ, 17 Southard, Trenton, N. J. Samples, 10¢.

**WANTED:** Electro Importing, DeForest, Marconi, Wireless Specialty Apparatus; QST, Wireless Age, Electrical Experimenter, Marconiographs before 1920. Early catalogs, etc. Please describe items in detail and give price wanted. Louis Risoli, WIAAT, 100 Bay View Ave., Salem, Mass.

**CRYSTALS**—Those hard-to-get spot amateur freqs. 1.8 to 7.4 Mc., \$2.50. Pennsylvania Crystal Co., R. 2, Knox, Penna.

**BEAT TVI**, One 7" television receiver, \$35.00. One 10", \$50. Excellent as monitor, other uses around shack. WAAPL, Spitz, 1420 South Randolph, Arlington, Virginia.

**WANTED:** BC348 receiver, State price and condition. Write to R. Wegelin, 410 Cedar St., N.W., Washington, D. C.

**QSL's?** QSL's? America's finest and largest variety, super-gloss QSL samples, 25¢. Sakkers, W8EDL, 53 East 7th St., Holland, Michigan.

**SELLING out:** Transmitter 500 watts (pair 4-125A), Meissner Deluxe signal shifter, Wilcox CW3 receiver, BC459A and power supply, BC454B, BC455B and power supply. Many other items. Send for list. Fred Greening, W9KHS, 414 St. Julian St., Pekin, Ill.

**FIRE** extinguishers Underwriters approved, for shack, \$9.95 pre-paid. Thompson, W3CQS, 735 Silver Spring, Silver Spring, Maryland. Free Folder.

**DON'T fail!** Check yourself with a time-tested "Surecheck Test", similar to F.C.C. tests. Novice, \$1.50, General \$1.75, Amateur Extra, 1013 7th Ave., Worthington, Minn.

**PRECISION** made, custom built antennas for all bands . . . literature available. Antenna, Incorporated, Wakefield, R. I.

**FREE list.** Used Collins, Elmac, Hallicrafters, Hammarlund, Harvey-Wells, Lyco, National, RME, Sonar, etc. Lowest prices. Livers trades, Dossett, W9BHV, 855 Burlington, Frankfort, Indiana.

**WANTED:** ART-13 transmitter and parts. Write B. Spivey, 7013 Rolling Road, Chevy Chase, Md.

**WANTED:** RCH receivers, RBS receivers and SLR receivers, Navy type equipment. Also, 1-135 Test sets. Write immediately stating condition and price in first letter. GME, Inc, 7315 Varna Ave., North Hollywood, Calif.

**MOBILE Headquarters.** All leading products including Elmac, Morrow, Gonsert, RME, Mallard, Master Mount, Harvey-Wells, Sonar. New and used. Closing out superseded models. Outstanding trades and terms. Don't wait for Johnson Viking deliveries. We have huge stock and ready to do business immediately. Also complete stocks of Collins, National, Hallicrafters, RME equipment. Our trade-in department is bulging with countless items, large & small. Write today for our latest bargain list. Remember outstanding trades and terms. Burghardt Radio Supply, Watertown, South Dakota.

**CRYSTAL** mike, cable & switch, \$3.98; Diodes 1N34, ten for \$5.98; power supply kit, 350 W VDC/60 Ma., transformer, tube, choke, condenser, \$3.69. Sell your surplus tubes, equipment. Free Tabogram. "TAB", 111 Liberty St., New York City, N. Y.

**SELL:** Electro-Voice speech clipper Model 1000, slightly used, \$13.00. W9WUI, Box 171, Henderson, Minn.

**FOR Sale:** PE103A's, \$20 each. Also have many ham items for sale or trade. W4VYN, 187 N. Lumpkin, Athens, Ga.

**COLLINS** Aircraft phone transmitter, like new condition with maintenance manual, uses 813 final, 811 modulators. 3105-6210 Kc 24 volt operation. Dynamotor mounted on transmitter chassis. Fine for high power. Agency transmitter, can be easily converted for other frequencies and AC operation. Trade for good communications receiver, recorder, test instruments, late portable typewriter, or photographic equipment. Dave Williams, W5AJF, Box 915, Bartlesville, Okla.

**ATTENTION** Ham! Beautiful closely woven cotton Throw Rug in pastel colors with your call letters hand-painted in large shaded letters. Rugs have beautiful fringe all way round. Fast dyes in the following colors: White, Green Spray, Grey Mist, Radiant Rose, Maroon Yellow. We select colors for call letters to match. Sizes 21" x 34", \$5.00; 30" x 54", \$10.00. Please send money-order with order, and allow for postage and any sales tax (where tax applies). Be sure to specify color you want. 73. Chatsworth Mig. Company, Wilbur Jackson, WAAYR, Chatsworth, Ca.

**WANTED:** Full KW final, modulator, and power supply. Complete or just the parts. Describe in detail with price. Your offer will be given every consideration. E. Johnson, W6PFX, 123 North Berry Road, Glendale 19, Mo.

**WANTED:** Panoramic adaptor BC1031B or R.F. components and B.T.O. for same. Cash or trade. Wm. Alnick, W2Q1B, 128 Devon Terrace, Kearny, N. J.

**WANTED:** QST December 1915 thru February 1917 (except Oct. '16); October 1919, June and Aug., Oct. 1922, Trade or sell QST November 1920; April, May, June, July, November 1921; January, October 1926, also 1926 and 1927 complete, bound. Want also IRE Proceedings, Vol. I through IV, except Vol. I, No. 1 and Vol. III, No. 4; Electronics for April, May, June 1930; Bell Telephone System monographs or reprints Nos. 2, 24, 280, 353, 739, 745, 755, 785, 802. Col. C. W. Jones, W4K5, c/o TESS, Camp Gordon, Ga.

**HAMMARLUND** SP400X, looks like new, performs like new; includes matching amplifier. Best offer over \$200.00 takes it. Brand new Millen 04060 transmitting cond., \$17.50; prewar DeLuxe Meissner Signal Shifter, \$25.00. W5MAM, Brieske, 5935 Southville Ave., Houston 21, Texas.

**2-METER** mobile complete, less mike and antenna mount. Consists of RCA AVT-114 postwar aircraft VHF transmitter, 6, 12, 24 volts, Gonsert 2 meter converter, coax relay, Master coax antenna, 2 crystals. Will mount under dash. \$120.00 or trade for receiver. Myers, W5QCP, 245 East Key Blvd., Oklahoma City 10, Okla.

**QSL's** two colors, \$7.00 a thousand, Samples, 10¢. VE3JLG, G. LaFleur, 25 Queen Mary St., Ottawa 2, Canada.

**FOR Sale:** Amertran components, 2, 100 amp. 110 volt transistats, \$75 each; 8, 872 filament transformers, \$7.50 each. Oil filled choke 20H.V., 5 amp, 15 Ky insulation, less oil, \$50.00. H. Clark, 299 NJ RR Ave., Newark, N. J.

**VOIR** Call Letters engraved in beautiful black plastic; white letters, Plexiglass base. Delivery about 6 weeks, only \$2.50. Cash, check, money order. Rocky Mountain Engraving Co., 3813 Calle Dell Monte, Albuquerque, N. Mex., W5THS, Larsen.

**WANTED:** Mobile equipment, Gonsert and fixed station, Collins, in trade for Colt single action, Winchester Mod. 70, reloading tools, etc. W. E. Gallas, 333 Addison Rd., Riverside, Ill.

**SALE:** Jeannette rotary converter, 115 VDC 4.2 amps. Output 110 VAC 60 cycles 9.3 KVA. In excellent condition. \$35.00. W8VJ1, L. P. Atwell, 835 Capistrano, Toledo, Ohio.

**SELL:** Brand new (2-meter) 1-126/ARC-5 transmitter, Price: \$40.00. Spencer Miller III, W1VNN, 259 Longmeadow St., Longmeadow, Mass.

**ESTATE** of W3JBT: QST, 1929 to date. Type 813 tubes, \$6.00 each; LM frequency meter with calibration book, \$40.00. Dynamotors, tubes, meters, crystal-pitch motors, dual, aircraft receivers, transmitters, BC-459A, Wilcox Type F-3, many other items. List available. J. A. Guida, 2904 Newcastle Ave., Silver Spring, Md.

PERSONALIZED calling cards and stationery with your call letters. Free samples. Craftsmen Printing, 3301 North 28th Ave., Omaha, Neb.

**FOR SALE:** Complete 1000-1250-1500 500 mill volt power supply, nothing else to buy, \$37.50. Wired and mounted. Also complete power supply 1700-2000-2300 volt 300 mill, mounted and wired, nothing else to buy, \$37.50. Power supply for Collins ART13. Complete, with power cable and plug, \$65.00, or will buy ART13, K. C. Horne, Stevely, Missouri.

**WANTED:** AN/APR-4, APR-5A, ARC-1, ARC-3, ART-13, etc.; TS-12 and other "TS," particularly Microwave equipment, even salvage; VHF frequency meters and signal generators; quantities of 723A/B, 3C22, etc., tubes; any Laboratory equipment. Top cash or swap; rush! For sale: 304TL tubes, 4 for \$20.00; factory reconditioned glass Watthour flashlamp, trigger transformer, in case, \$7.50; 151.00; X400 mercury flashlamp, trigger transformer, in case, \$7.50; FI-8A filter, \$6.00; FI-3F filter, 2 for \$6.00. Engineering Associates, 434 Patterson Road, Dayton 9, Ohio.

**SELL:** 120 W-10 thru 80 phone-CW xmitter. Integral Clapp VFO. 829B final, Class B modulators, heavy duty power supplies, voltage regulated where required. PI output. De-TVI'd through 20 meters. No bugs. \$150.00 delivered within 250 miles. WBRAC-4, 500 Jamestown Rd., Williamsburg, Va.

**FOR SALE:** National HRO 50TS speaker, National Select-O-Ject, SOJ-3, National HRO-50-XCU-2 calibrator 100/1000 kc; National NFM adapter for HROSO, all for \$40.00. WIDBS John Savonis, 11 Dwright Court, New Britain, Conn.

**BARGAINS:** Extra special: Motorola P-69-13, Mobile receivers, \$29.50; Globe King 31000, HT-9, \$199.00; HRO-50, \$275.00; Lyaco 600 \$109.00; HRO-7 \$199.00; Collins 75A1 \$275.00; HRO-ST, \$175.00; SX-71, \$169.00; SX-42 \$189.00; SX-43 \$129.00; HRO-Senior \$119.00; RME-2-11 \$99.50; RME-45 \$99.00; Measner EX, \$157.00; SX-40A, or SX-16, \$69.50; VHF-152, \$59.00; HR-10-20, \$59.00; Globe Trotter \$69.50; MB611 mobile transmitter, \$119.95; 90800 exciter \$29.50; XE-10, \$14.95; Gonset 10-11 converter \$17.50, and many others. We need used mobile, coaxial dipole with allowances for S20R, S-40A, B; NC-57; NC-100; NC-125; SX-24; SX-25; HQ-129X, and similar receivers. Free trial. Terms financed by Leo, W6GQF Write for catalog and best deal to World Radio Laboratories, Inc., 740-44 West Broadway, Council Bluffs, Iowa.

**BARGAINS:** New and reconditioned Collins, Hallicrafters, National, Hammarlund, Johnson, Elmac, Harvey-Wells, Balcock, Gonset, Morron, RME, Miller, Measner, Lyaco, Workshop, Hylite, etc. Reconditioned S77 \$69.00; S40B, \$79.00; S76, \$129.00; SX71, \$149.00; SW54, \$15.00; NC57, \$69.00; HPS \$99.00; NC125, \$129.00; NC131, \$149.00; NC183, \$199.00; HF-10-20, \$49.00; VHF152A, \$59.00; Gonset Tri-band, \$29.00; Collins 32V1, \$375.00; HQ129X, SP400X, SX43, SX42, SX62, Collins 75A1, Collins 75A2, 32V2, Viking 1, many others. Shipped on trial. Terms. Write for free list, Henry Radio, Butler, Mo.

**GONSET** Triband, excellent condition, low on includes 15 meter band instructions, schematic, \$35.00. W6JOM, 715 Mira Mar, Long Beach, Calif.

**250TL's.** New pair, \$25.00 postpaid. WASOR.

**SWAP** Olsson "23" model engine for ham gear. Swap Q5'er and cash for 20-meter beam. W4QCV.

**NEW YORK CITY** and vicinity only, for sale: 2 mtr. T-23 VHF ARC-5 xmitter, \$25.00; Master Mobile 2-10, coaxial dipole with 50 ft. coax, \$8.00; Eldico grid dipper, \$18.00; BC-453, \$15.00; BC-455, \$7.00; beautiful 30-40 watt xmitter in relay rack cabinet, AM phone, c.w., very stable VFO, final on 20 meters, can easily be put on 40. Completely TVI suppressed; low-pass filter, 3 meters coax relay, etc. \$85.00; 3 tube xtal oscillator ideal for IF alignment, band-edge marking, etc. \$8.00; Hi-B F.M. tuner, amplifier, recorder-changer in beautiful modern cabinet, \$100.00; W2VZT "Ernie" Palinkas, 335 E. 69th St., N. Y. C. Phone Eva TR 9-2120.

**COMPLETE** Motorola P69-18ARS receiver with noise clipper and Gonset Tri-band and FMT-30-DMS dual frequency FM-AM transmitter complete with all controls, cables, mike, generator, relays. Factory reconditioned and adjusted. BC-456B modulator. Carter Gene-motor (not surplus) 450 volts at 275 Ma. at 6.3 volt input (6 volt solenoid supplies). Gonset noise clipper. Best offer F.O.B. W9PJX, Robt. W. Shoemaker, 1, Box 828, Anderson, Indiana.

**BARGAIN:** 125 watt xmitter 4-65A final, xtal mike, Budd VFO, 10-80 coils, \$125.00 F.O.B. No time for hawking. Dr. A. R. Watson, 1306 S. 27th St., Temple, Texas.

**WANTED:** AN/ARC-1 or AN/ARC-3 or components. Write to J. Durrant, 5526 Parkland Court, Apt. 202, Washington, D. C.

**WILL** pay cash for used receiver. Box 4, Kearney, Nebraska.

**WANTED:** Collins 310 B-1 exciter, also for sale new, PE-103, \$30.00 F.O.B. W4GJS, Box 132, Goldsboro, N. C.

**SELL:** SCR-522, transmitter unmodified, receiver converted to tunable oscillator for two meters, \$27.50; BC-457 and BC-458 transmitters on dual rack, \$12.50; Electronics Laboratories power pack, output 12 volts DC, 10 amp, \$22.50. W8ILJ, John A. Miller, Hebron Road, Route 5, Newark, Ohio.

**TRADE:** Omega enlarger 2 1/4" x 2 1/4" with 4.5-75mm Kodak lens. Interested in communication receiver. Philadelphia or vicinity preferred. J. Hudson, WJTMJ, 156 S. Easton Road, Glenade, Penna.

**FOR SALE:** Arc-4, tubes and dynamotor, \$30.00; BC-455-A 40 mtr rcvr, 115V power supply, \$22.50; BD-77-L dynamotor, cables, relays, filter, \$25.00; Broadcast band auto rcvr, mounts under dash, one piece unit includes spkr and vibrator, new, \$30.00. Walt McCoy, W9LZL, 433 Stephens, Wichita, Kansas.

**FOR SALE:** 32V-3, \$700; 75A-2, \$400. Both brand new. Or will trade either for clean 32V-1 and cash. Capt. James Craig, W5VRO/6, Box 6119, Mather AFB, California.

**NC-183D** receiver, new, less speaker: \$270 cash. Only one. W3WTV, Box 1054, NSC, Natchichee, La.

**V.F.O.** Sonar C.F.C., \$29.50. Make good Novice transmitter and use in rite later when get General license. W5ALA, 4531 Fairway, Dallas 19, Texas.

**SELL:** BC-1006 Super-Pro, 550 kc. to 20 mc. In desk cabinet. Excellent shape, with power supply, \$175.00. Bill Orr, W6SAI, 555 Crestline Drive, Los Angeles 49, Calif.

**FOR SALE:** Complete station, includes HRO STAI rcvr, all band 300 watt phone, 750 watt c.w., TVI-suppressed transmitter, Measner VFO, dual beam antenna 3-element 10, 2 element 20 with commercial indicator and rotator. \$550. Photo on request. Al W. Speyers, W2CZA, 39 Lowell Ave., Summit, N. J.

**SELL:** National 240-D, rack-mounted, \$140. HT-18, \$65.00. Excellent condition. Al Raper, 3387 West 76, Denver, Colorado.

**QSL'S** Interesting samples, 10¢. Tooker Press, P.O. Box T, Lakeshurst, New Jersey.

10, 15 and 20 meter beams, aluminum tubing, etc. Perforated aluminum sheet for shielding, Radcliff's, 1720 No. Countyline St., Fostoria, Ohio.

**QSL** samples. Dime, refunded. Roy Gale, W1BD, Waterford, Conn. SELSVNS or asynchon wanted: Navy or Army ordnance 60 cycle types. Will pay \$15.00 each for 1DG, 1DF, 1CT, 1C, 1F, \$25.00 each for 5DG, 5G, 5F, 5CT; \$20.00 each for 5D, 6G, 6CT, 6DG, or sizes 7. Subject to inspection. Other types advised. Also want: Autovision, Servo Control motors, PM motors, inverters, tubes and other electronic components. Electro Sales Co., Inc. 58 Eastern Ave., Dept. Q, Boston 13, Mass.

**HAMFEST** June 7, 1953. Come to Camp Ki-Shau-Wau where the Starved Rock Radio Club will again hold their annual Hamfest. Games, contests and entertainment for all. Awards for Novice-built equipment. Ham trading post and other features, including free coffee and doughnuts at 10 AM. Follow the Hamfest sign south from Junction of Illinois Routes 178 and 71 near Starved Rock State Park, or East on blacktop road from Route 51 at Tonicia, Illinois. Registration. One dollar prior to May 25th. One-fifty at the Hamfest. For additional information, write WBMKS, Starved Rock Radio Club, Inc., Box 22-A, Utica, Illinois.

**FOR SALE:** Type 90600, Complete set 3Mc to 140 Mc Millen absorption frequency meters in wood case, like new. \$15.00. W6VBL, Glenn F. Markley.

**SELL:** Precision signal generator, #E-400, new, \$83.00. #21A teletype midget printer, \$50. Teletype tape transmitter, \$35.00; #12 teletype page printer, receiving distributor, polar relay, cable, \$15. Want: ARC-1-13, EY-12, GN-38, APR-4, Tom Howard, W1AFN, Box 19, Boston 1, Mass. Richmond 2-0916

**EARLY** QSTs, in good condition, unbound, 25 copies 1916-1921; complete, March 1922-December 1927. \$175.00 takes all 95 copies, plus two 1928s. Fred Dye, 210 Murphy Building, Detroit, Michigan.

**COLLINS** 10 meter mobile power supply, Gonset 10-11 converter and noise clipper, complete, except antenna, \$80.00 F.O.B. Orville Braaten, W9NY1, 1131 Park Avenue, Morris, Minn.

**SELL:** 300w modulator with power supply, tubes, meters; 60w modulator with 125w modulation transformer, speech amplifier, tubes; 150w transmitter with low voltage power supply, tubes. R. H. Beers, 33 Sterling Drive, Livingston, N. J.

**FOR SALE:** SP-400X Super Pro in excellent condition, to the highest bidder. J. A. Hagen, 1315 South 29th St., Birmingham, Ala.

**FOR SALE:** Collins 75A-1, less speaker. Antenna trimmer added and revised as per W6SAI article. Recently aligned. \$250.00. Gordon Nordstrom, W1CQC, 1651-11th St., N.W., Cedar Rapids, Iowa.

**SELL:** HQ-120X for rack mounting, excellent, \$75.00. WAHLO.

**FOR SALE:** Three Motorola mobile transmitters, Model 69-20A, one Harvey all complete with cables, control box, Tri-band converter. J. R. Lorraine, Chatham, Mass.

**JOHNSON** Viking II trans., \$270.00. Used 2 months. Also SX-25. Make me an offer. WHCC, 628 Jackson St., Sandusky, Ohio.

**BC-522A**, new, never in a/c, with TM meter; BC-1303 control unit, transmitter original, receiver tuneable, three crystals, a/c power supply, all \$125.00. J36 Vibroplex new, \$10.00; Model 3256 Triplett frequency meter, perfect, \$12.00; Alliance Tenna-Rotor, new, original carton dir., \$20.00. W6NJE, Box 1265, Sacramento, Calif.

**FOR SALE:** Navy ATD aircraft transmitter complete, \$50.00. Chicago-Webster wire recorder, Model 78-1, wire-mike, etc. complete, \$30.00. Gonset 14 mc. mobile converter \$10. Kaar 1700 kc. mobile receiver with noise clipper, \$15. W. C. Plumb, 22 Windy Way, Morris Plains, N. J.

**SELL:** RME-45 with speaker, \$70.00; Hickok Model 177X signal generator, \$35.00; BC453, \$10.00; BC454, \$5.00; BC455, \$5.00 Bruce Wood, 16 Bradley St., Warren, Penna.

**FOR SALE:** Harvey-Wells TBSS0D transmitter with APS50 power supply, \$130.00; Gonset Tri-band converter, \$30.00; Gonset noise clipper, \$5.00; Master Mobile Mounts and center loaded antenna, \$10.00; PE103A converter, base and cables, \$25.00; Astatic dynamic push-to-talk microphone, \$15.00. All for \$200.00. Kilowatt phone, pair of 304TL's final, \$400.00 (parts alone worth \$700.00). No shipping. Send 25¢ for pictures and data. Small stable VFO and voltage regulated power supply, 5 watts 80 and 40, National ACN dx-22, \$25.00. Gonset Viking II transmitter and VFO in trade. C. W. Cook W5MBE, En. Ineer, City Hall, Alexandria, Louisiana.

**SURPLUS** Measner 150-B xmttr, \$13, \$11's mod. 250 w., unmodified, excellent, \$240.00; HRO-50T, 7 coils, xtal calib., speaker, excellent, \$270.00; two 5G's, \$25.00; Triplett 666-H multi-meter, \$13 rack dolly, \$8.00; two 304-TL's, \$5.00 ea. GL-6C21, \$20.00; AVA-126-A vibrator power supply, new, \$25.00; Collins TCS, misc. parts. W2OVV, Vadney, 1833 8th Ave., Watervliet, New York.

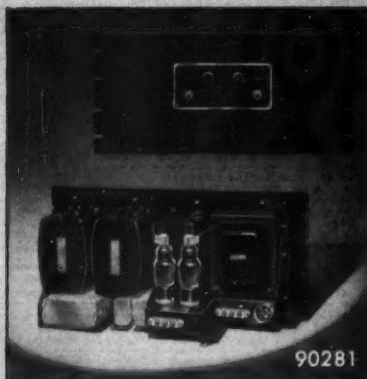
**WANTED:** R8er, 10 and 20 coils, reasonable, OK. Sell or trade for Alliance HIR Tennarotor, new Magalip (seely) precision xmitter, receiver, pair DPDT arc relays. J. F. Neil, 1567 College Ave., Palo Alto, Calif.

**PE-103:** Have two to sell. Used and with 5-prong power plug, \$31.00. Brand new, \$38.00. Both have bags and battery cables. W2RUK, Socii, 3 1/2 Hulbert St., Ansonia, N. Y.

# Designed for



# Application



90281

## The No. 90281

### High Voltage Power Supply

The No. 90281 high voltage power supply has a d.c. output of 700 volts, with maximum current of 250 ma. In addition, AC filament power of 6.3 volts at 4 amperes is also available so that this power supply is an ideal unit for use with transmitters, such as the Millen No. 90800, as well as general laboratory purposes.

The power supply uses two No. 816 rectifiers and has a two section  $\pi$  filter with 10 henry General Electric chokes and a 2-2-10 mfd. bank of 1000 volt General Electric Pyranol capacitors. The panel is standard  $8\frac{1}{2}'' \times 19''$  rack mounting.

## JAMES MILLEN MFG. CO., INC.

MAIN OFFICE AND FACTORY  
MALDEN  
MASSACHUSETTS



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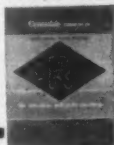
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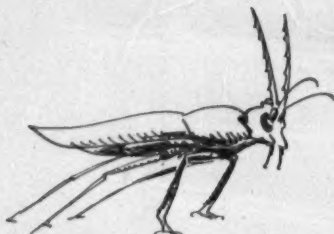
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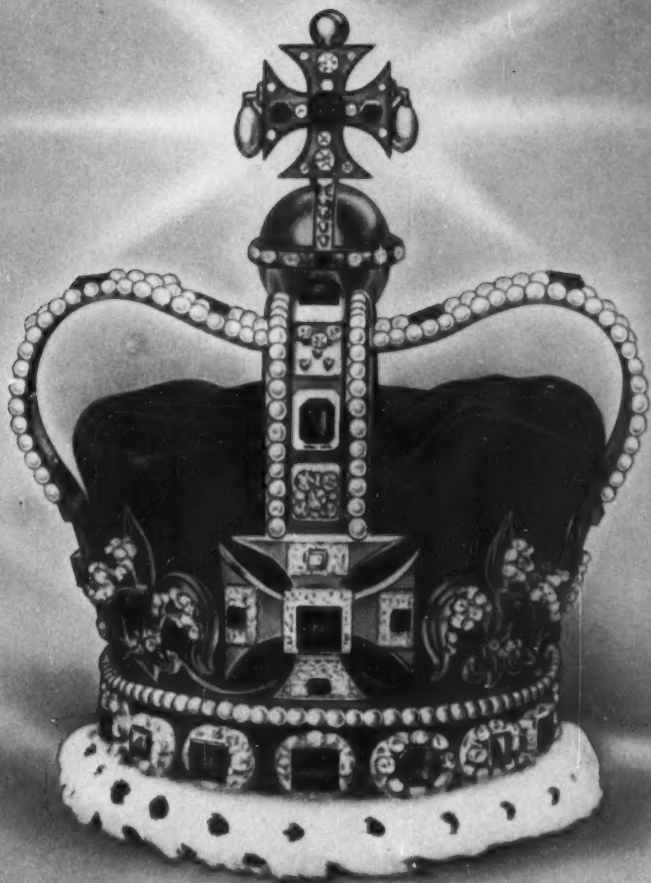
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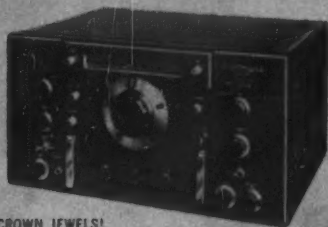
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30TH EDITION • 1953

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THE STANDARD MANUAL OF AMATEUR  
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